CellPath™ 300 ATM WAN Multiplexer Configuration Manual

MANU0120-02 - Rev. A, 2/2/98

Software Version 1.3

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Legal Notices

Printed in the USA.

FCC CLASS A NOTICE

WARNING: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void this user's authority to operate this equipment.

NOTE: The *CellPath*™ 300 has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of the equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

DOC CLASS A NOTICE

This digital apparatus does not exceed Class A limits for radio noise emission for a digital device as set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la class A prescrites dans le reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.

FCC REQUIREMENTS (Notice to Users of T1 Service)

The following instructions are provided to ensure compliance with the Federal Communications Commission (FCC) Rules, Part 68.

This device may be connected to the T1 network.

Before connecting your unit, you must inform the telephone company of the following information:

SOC	FIC	USOC
6.0N	04DU9-1SN	RJ48C

If the unit appears to be malfunctioning, it should be disconnected from the telephone lines until you learn if your equipment or the telephone line is the source of the trouble. If your equipment needs repair, it should not be reconnected until it is repaired.

If the telephone company finds that this equipment is exceeding tolerable parameters, the telephone company can temporarily disconnect service, although they will attempt to give you advance notice if possible.

Under the FCC Rules, no customer is authorized to repair this equipment. This restriction applies regardless of whether the equipment is in or out of warranty.

If the telephone company alters their equipment in a manner that will affect use of this device, they must give you advance warning so as to give you the opportunity for uninterrupted service. You will be advised of your right to file a complaint with the FCC.

CE NOTICE

Marking by the symbol **CE** indicates compliance of this system to the EMC (Electromagnetic Compatibility) directive of the European Community and compliance to the Low Voltage (Safety) Directive. Such marking is indicative that this system meets or exceeds the following technical standards:

- EN 55022 - "Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment."
- EN 50082-1 - "Electromagnetic compatibility - Generic immunity standard Part 1: Residential, commercial, and light industry."
- IEC 1000-4-2 - "Electromagnetic compatibility for industrial-process measurement and control equipment Part 2: Electrostatic discharge requirements." - Severity level 3.
- IEC 1000-4-3 - "Electromagnetic compatibility for industrial-process measurement and control equipment Part 3: Radiate electromagnetic field requirements." - Severity level 2.
- IEC 1000-4-4 - "Electromagnetic compatibility for industrial-process measurement and control equipment Part 4: Electrical fast transient/burst requirements." - Severity level 2.

CERTIFICATIONS

ETL certified to meet Information Technology Equipment safety standards UL 1950, CSA 22.2 No. 950, and EN 60950.

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NOTICE: The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Industry Canada label does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

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従って、住宅地域またはその隣接した地域で使用すると、ラジオ、テレビジョン受信機等に受信障害を与えることがあります。

取扱説明書に従って正しい取り扱いをして下さい。

This equipment is in the Class 1 category (information equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council For Interference by Information Technology Equipment aimed at preventing radio interference in commercial and/or industrial areas. Consequently, when used in a residential area or in an adjacent area thereto, radio interference may be caused to radios and TV receivers, etc. Read the instructions for correct handling.

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Preface

The intent of this manual is to supply users of the *CellPath*™ 300 ATM WAN Multiplexer with all the necessary information to configure and run the *CellPath* 300 successfully. This document was created for users with various levels of experience. If questions or problems with the installation arise, please contact FORE Systems' Technical Support.

Chapter Summaries

Chapter 1 - Introduction - Provides basic information about the *CellPath* 300 ATM WAN Multiplexer including its modular architecture and port connectivity.

Chapter 2 - Configuring Clocking - Provides information and examples of the various methods of configuring clocking through the *CellPath* 300.

Chapter 3 - System Configuration - Provides information on configuring the system, as a whole, including resetting system defaults, setting system passwords, and entering a system name.

Chapter 4 - Configuring Remote Access - Provides information and procedures to configure the *CellPath* 300 so that it can be accessed remotely for network management.

Chapter 5 - Configuring Ports - Provides detailed descriptions of the parameters required to configure individual ports on *CellPath* 300 physical layer modules (PLMs).

Chapter 6 - Configuring Connections - Provides detailed descriptions of the parameters required to configure connections on the *CellPath* 300.

Appendix A - Converting DFAs or DLCIs and VPI/VCIs - Provides tables and formulas for performing header conversions between DFAs or DLCIs and VPI/VCIs.

Appendix B - Configuration Worksheets - A set of worksheets that can be used to configure the *CellPath* 300 'on paper' before going through the actual steps of configuring. These worksheets can be saved to maintain a written copy of a systems configuration.

Technical Support

In the U.S.A., you can contact FORE Systems' Technical Support using any one of the following methods:

1. If you have access to the Internet, you may contact FORE Systems' Technical Support via e-mail at:

   support@fore.com

2. You may telephone your questions to "support" at:

   800-671-FORE or 724-635-3700

3. You may FAX your questions to "support" at:

   724-742-7900

4. You may send questions, via U.S. Mail, to:

   FORE Systems, Inc.
   1000 FORE Drive
   Warrendale, PA 15086-7502

Technical support for non-U.S.A. customers should be handled through your local distributor.

No matter which method is used for support, please be prepared to provide your support contract ID number, the serial number(s) of the product(s), and as much information as possible describing your problem / question.

Typographical Styles

Throughout this manual, all specific commands meant to be entered by the user appear on a separate line in bold typeface. In addition, use of the `Enter` or `Return` key is represented as `<ENTER>`. The following example demonstrates this convention:

cd /usr <ENTER>

File names that appear within the text of this manual are represented in the following style: "...the `fore_install` program installs this distribution."

Command names that appear within the text of this manual are represented in the following style: "...using the **flush-cache** command clears the bridge cache."

Subsystem names that appear within the text of this manual are represented in the following style: "...to access the **bridge** subsystem..."

Parameter names that appear within the text of this manual are represented in the following style: "...using *<seg-list>* allows you to specify the segments for which you want to display the specified bridge statistics."

Any messages that appear on the screen during software installation and network interface administration are shown in `Courier` font to distinguish them from the rest of the text as follows:

```
.... Are all four conditions true?
```

Important Information Indicators

To call your attention to safety and otherwise important information that must be reviewed to insure correct and complete installation, as well as to avoid damage your system, FORE Systems utilizes the following *WARNING/CAUTION/NOTE* indicators.

WARNING statements contain information that is critical to the safety of the operator and/or the system. Do not proceed beyond a **WARNING** statement until the indicated conditions are fully understood or met. This information could prevent serious damage to the operator, the system, or currently loaded software, and will be indicated as:

WARNING!

Hazardous voltages are present. To lessen the risk of electrical shock and danger to personal health, follow the instructions carefully.

Information contained in **CAUTION** statements is important for proper installation/operation. **CAUTION** statements can prevent possible equipment damage and/or loss of data and will be indicated as:

CAUTION

You risk damaging your equipment and/or software if you do not follow these instructions.

Information contained in **NOTE** statements has been found important enough to be called to the special attention of the operator and will be set off from the text as follows:

NOTE

Steps 1, 3, and 5 are similar to the installation for the computer type above. Review the previous installation procedure before installation in your particular model.

Laser Warning

Class 1 Laser Product:
This product conforms to applicable requirements of 21 CFR 1040 at the date of manufacture.

Class 1 lasers are defined as products which do not permit human access to laser radiation in excess of the accessible limits for Class 1 for applicable wavelengths and durations. These lasers are safe under reasonably foreseeable conditions of operation.

The *CellPath* 300 OC-3c / STM1 single-mode physical layer modules contain Class 1 lasers.

Safety Agency Compliance

This preface provides safety precautions to follow when installing a FORE Systems, Inc., product.

Safety Precautions

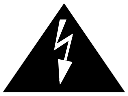
For your protection, observe the following safety precautions when setting up your equipment:

- Follow all warnings and instructions marked on the equipment.
- Ensure that the voltage and frequency of your power source matches the voltage and frequency inscribed on the equipment's electrical rating label.
- Never push objects of any kind through openings in the equipment. Dangerous voltages may be present. Conductive foreign objects could produce a short circuit that could cause fire, electric shock, or damage to your equipment.

Symbols

The following symbols appear in this book.

WARNING!



Hazardous voltages are present. If the instructions are not heeded, there is a risk of electrical shock and danger to personal health.

CAUTION

If instructions are not followed, there is a risk of damage to the equipment.

Modifications to Equipment

Do not make mechanical or electrical modifications to the equipment. FORE Systems, Inc., is not responsible for regulatory compliance of a modified FORE product.

Placement of a FORE Systems Product

CAUTION

To ensure reliable operation of your FORE Systems product and to protect it from overheating, openings in the equipment must not be blocked or covered. A FORE Systems product should never be placed near a radiator or heat register.

Power Cord Connection

WARNING!

FORE Systems products are designed to work with single-phase power systems having a grounded neutral conductor. To reduce the risk of electrical shock, do not plug FORE Systems products into any other type of power system. Contact your facilities manager or a qualified electrician if you are not sure what type of power is supplied to your building.

WARNING!

Your FORE Systems product is shipped with a grounding type (3-wire) power cord. To reduce the risk of electric shock, always plug the cord into a grounded power outlet.

CHAPTER 1 Introduction

The *CellPath* 300 ATM Access Multiplexer (Figure 1.1) is a multiport device that accepts an incoming communications stream, converts it to ATM cells, and cross-connects it to one or more output ports. Incoming traffic can be ATM cells, packets, or constant bit rate communications. Before the traffic exits the *CellPath* 300, it is either converted back to its original format or is left as ATM cells.

The *CellPath* 300 can cross-connect traffic between any two ports (assuming the ports have been configured with compatible protocols). Typically, this functionality is used to convert various types of traffic to ATM cells so that they can be concentrated on one or more ATM trunk lines. The "any-to-any" port connectivity also makes local traffic connectivity possible.

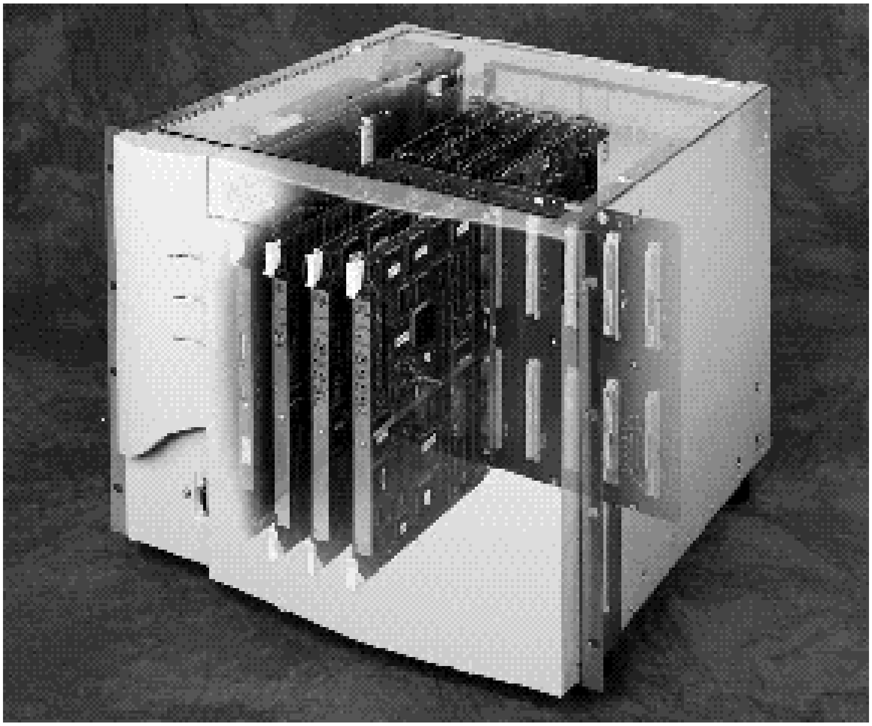


Figure 1.1 - *CellPath* 300: Migrating to ATM Technologies

The architecture of the *CellPath* 300 is built around an ATM cell-bus midplane in which physical modules and protocol modules are inserted to support various combinations of communication protocols and physical line types. This modular design allows the *CellPath* 300 to be customized to meet the needs of the specific site.

The *CellPath* 300 features traffic management that can control traffic flow to meet site requirements. Traffic management includes both early packet discard (EPD) and partial packet discard (PPD) for virtual channel connections.

1.1 Cell-bus Midplane Architecture

A modular architecture centered on an ATM cell-bus midplane offers the flexibility to build the system desired.

The *CellPath* 300 is based on an ATM cell-bus midplane into which various module combinations can be inserted to build the system to support the needs of the site. Each *CellPath* 300 has a System Controller module and an Extension module in the first slot. The remaining seven slots can be filled with any of the other available modules, see Figure 1.2. Modules can be replaced without disrupting traffic traveling over other modules.

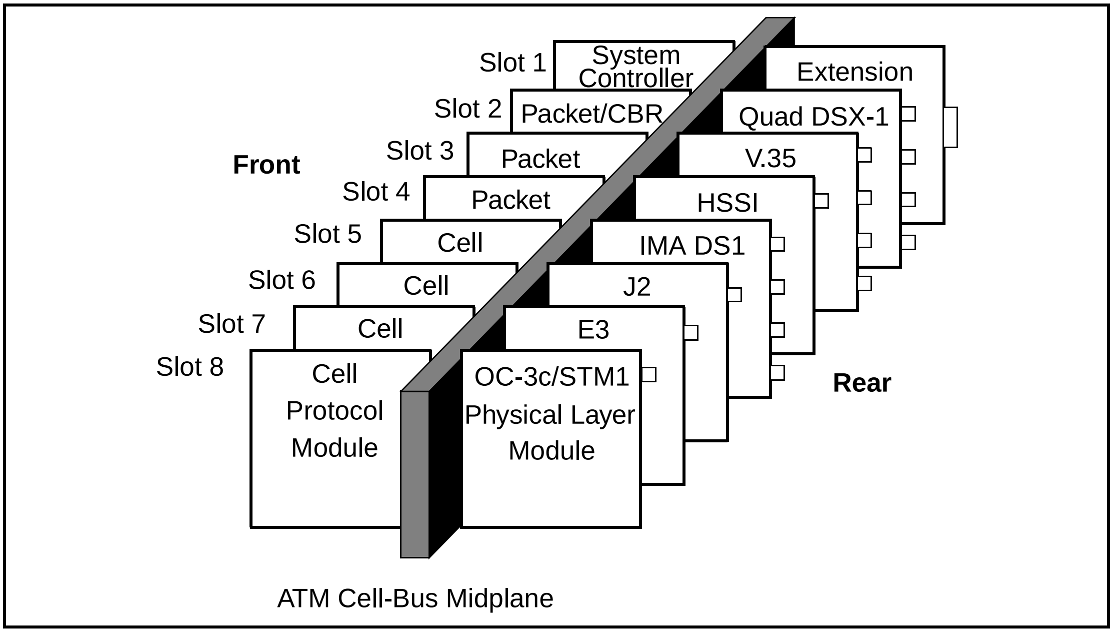


Figure 1.2 - *CellPath* 300 Modular Design

Modules function in pairs, refer to Figure 1.3. Each slot contains a protocol module (PM) in the front and a physical layer module (PLM) in the rear, combining to support the protocols over various line types.

Protocol / **Physical Layer**	V.35/ EIA-530	HSSI	DSX-1/ E1	IMA DS1/ IMA E1	DS3/ E3	J2	OC-3c/STM1 (single/multi-mode)
ATM UNI			✔	✔	✔	✔	✔
ATM DXI	✔	✔	✔		✔	✔	
Frame Relay	✔	✔	✔		✔	✔	
HDLC	✔	✔	✔		✔	✔	
CBR (circuit emulation)	✔		✔				

Figure 1.3 - Protocol / Physical Layer Combinations

1.2 Any-to-Any Port Connectivity

Any-to-any port connectivity means connections can be configured between any two ports, assuming the protocols are compatible. Figure 1.4 shows an example of a typical application. The *CellPath* 300 is installed at a customer premise to concentrate traffic of various types over a single ATM feed provided by a carrier. The customer premise has two routers, an ATM switch, a video codec, and a PBX, all directing traffic through the *CellPath* 300 and out to the carrier's line.

Besides the cross-connections to the ATM feed, the routers and ATM switch also have some cross-connections to each other. This feature is sometimes referred to as "local traffic connectivity." With concentrators that do not have local traffic connectivity, the only way to cross-connect local devices is to send the traffic out to the public network and have the carrier make the cross-connection. This is more costly and less efficient.

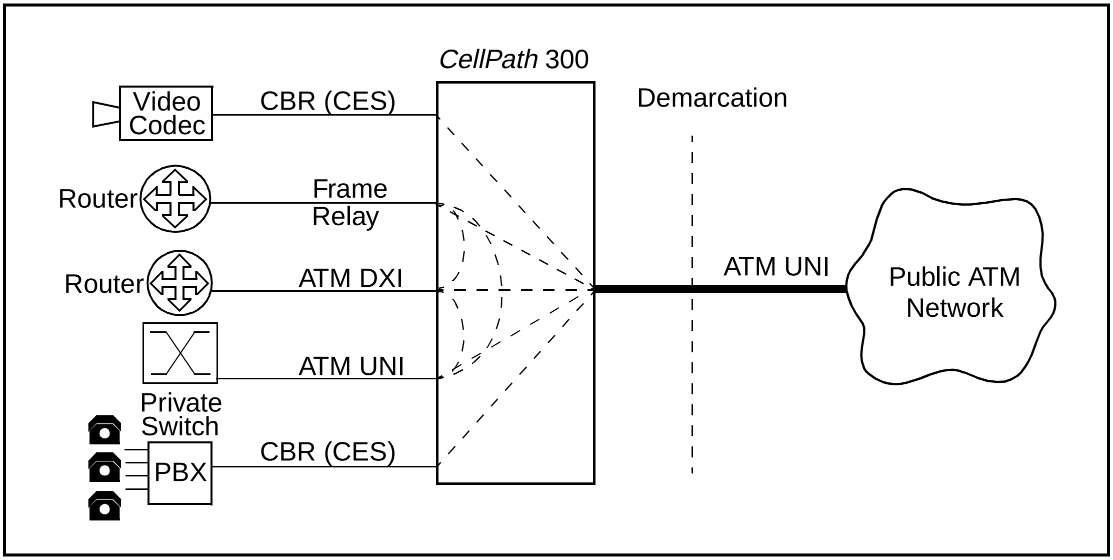


Figure 1.4 - *CellPath* 300's Any-to-Any Port Connectivity

NOTE

This figure shows a typical setup. It does not represent every type of interface the *CellPath* 300 supports.

CHAPTER 2 Configuring Clocking

This chapter describes basic options for setting up clocking on the ports of the *CellPath* 300. Topics covered include:

- Overview
- Specifying the system reference clock
- Setting up the port transmit clock
- Examples of network configurations and appropriate clocking strategies

2.1 Overview

For ATM networks to function well at full bandwidths, the equipment on the networks should be timed so that they are all transmitting and receiving data in a synchronized manner.

Besides the clock used to keep track of the date and time of day, two other kinds of clocks are used for timing data on the *CellPath* 300:

- The *system reference clock* is the main clock signal used to control *CellPath* 300 data passing operations.
- Each port also has a *port transmit clock*, which is used to regulate the transfer of data out of the port.

The uses of these two kinds of clocks and the ways they should be configured for different types of traffic are discussed on the following pages.

2.2 System Reference Clock

The system reference clock is used to time *CellPath* 300 operations, and is typically used as the source for the transmit clock of each port. The system reference clock is a ±20ppm Stratum 4 clock source, which runs at 32.768 MHz and is divided by 4 to 8.192 KHz before being distributed to the Protocol Modules (PM) and Physical Layer Modules (PLM). When the *CellPath* 300 is configured, a primary and a secondary system reference clock source need to be specified. The two options are:

- An external clock signal taken from any specified *CellPath* 300 port
- The *CellPath* 300 internal oscillator

When specifying a port as a clock source, the *CellPath* 300 either accepts a clock signal directly from the port (as in the case of a V.35 port, which has a separate clock signal, or derives a clock signal from the incoming data on that port (as in the case of a DSX-1 or OC-3c port).

When specifying the *CellPath* 300 internal oscillator as a clock source, the *CellPath* 300 generates its own timing from an internal crystal oscillator.

If the primary system reference clock source becomes unavailable, the *CellPath* 300 uses the specified secondary system reference clock source instead. If the secondary also becomes unavailable, the *CellPath* 300 uses its internal oscillator as a system reference clock source.

If the primary or secondary system reference clock source becomes available again after the *CellPath* 300 switches to a lower-priority source, the highest-priority source available becomes the system reference clock.

2.2.1 Limitations of Older V.35/EIA-530 PLMs

When one of the V.35/EIA-530 ports is used as the source of the *CellPath* 300 system reference clock, note that older V.35/EIA-530 physical layer modules (Revision 001 or 002) have a limited ability to monitor the quality of this clock source. In particular, unless this clock source wanders substantially off its set frequency by several thousand PPMs or disappears completely, the *CellPath* 300 does not detect a clock failure and switch to its secondary clock source or its internal reference. This means that the *CellPath* 300 system reference clock can drift up to ±200 PPM off of its intended frequency and remain in this state for an extended period with no specific alarms indicating a loss of clock source, though several other ports in the system are likely to experience alarm conditions.

Additionally, once the *CellPath* 300 has detected a clock failure and has switched from the V.35/EIA-530 port to another port for the system reference clock, it does not automatically switch back to the V.35/EIA-530 port. To make the clock switch back to the V.35/EIA-530 port:

- change the LOS Detect setting (in the V.35/EIA-530 Port Configuration screen) to force the V.35/EIA-503 port to raise an LOS alarm,
- then return the LOS Detect to its appropriate setting to clear the LOS alarm. This should cause the V.35/EIA-530 port to become the system reference again.

If newer V.35/EIA-530 physical layer modules (Quad V.35/EIA-530 physical layer module or Revision 3 or later Tri V.35/EIA-530 & DSX-1 and Tri V.35/EIA-530 & E1 physical layer modules) are being used, these measures are not necessary. The newer PLMs have clock detection and the system clock reverts automatically.

2.3 Port Transmit Clock

There are two options to select from for the transmit clock source for each port:

- The system reference clock source.
- The received clock can be “looped”, that is, use clocking from the signal received at the port. (Note that a CBR port cannot loop the received clock.)

If a port is the source of the system reference clock, the system clock should be used as the transmit clock source.

2.4 Typical Clocking Scenarios

The following examples illustrate typical situations and explain how to set up the *CellPath* 300 system reference and port transmit clocks in each.

2.4.1 Private Network Connections

When *CellPath* 300s serve to concentrate traffic on an ATM link in a private network (see Figure 2.1), all devices in the network should be timed off the internal clock of one of the *CellPath* 300s.

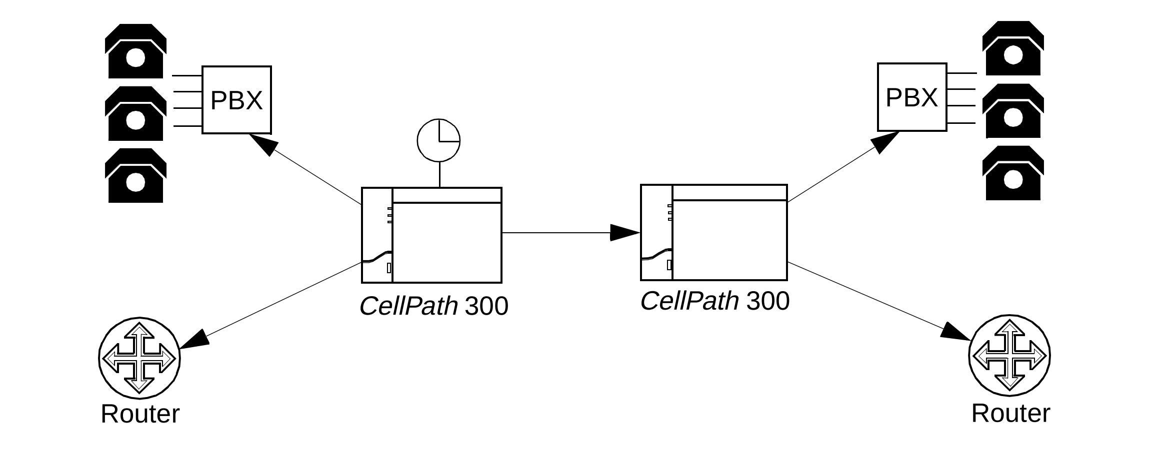


Figure 2.1 - *CellPath* 300 in a Private Network

To configure this network:

- On one of the *CellPath* 300s, use the internal oscillator as the system reference clock.
- On the second *CellPath* 300, use the transmitted signal of the first *CellPath* 300 as the system reference clock.
- On all ports on both *CellPath* 300s, use the *CellPath* 300 system reference clock as the port transmit clock.
- Time all the other devices from the *CellPath* 300.

2.4.2 Public Network Connections

When the *CellPath* 300 serves as the link between a private network and a public one (see Figure 2.2), it is usually best to use the public network's clock to time data transfers. This would be the case, for example, if the public network belonged to a carrier, such as a phone company.

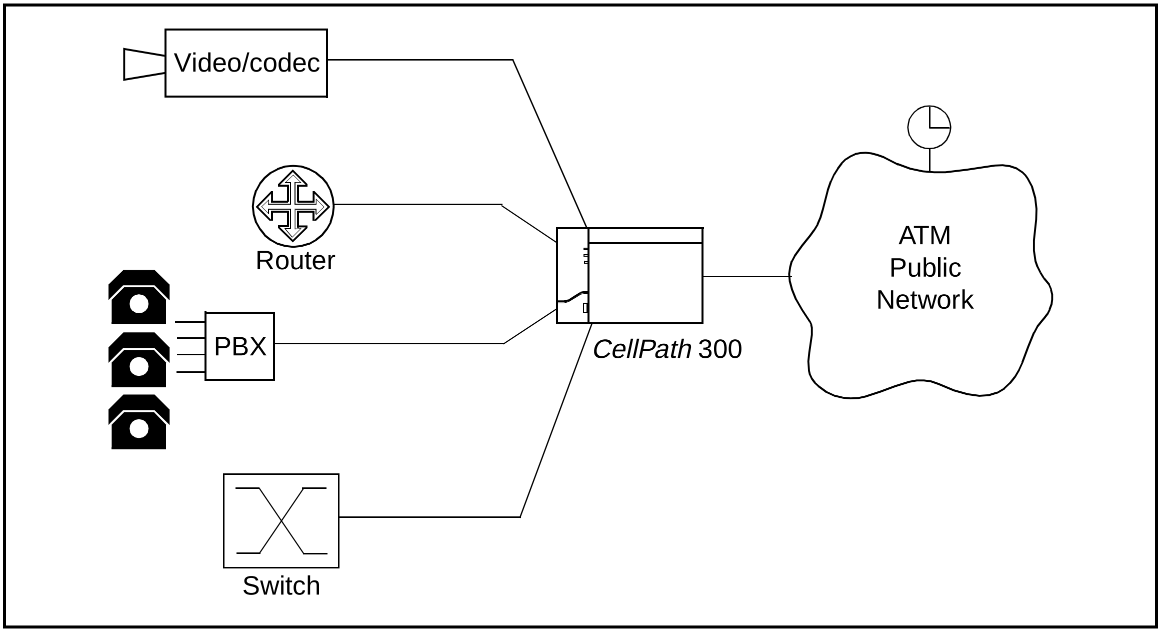


Figure 2.2 - *CellPath* 300 in a Public Network

The difference between this example and the previous one is that the *CellPath* 300 system reference clock must come from the public network instead of the *CellPath* 300 internal oscillator.

To configure this network:

- Set the *CellPath* 300 system reference clock to the clock signal coming from the port attached to the public network.
- On all ports, set the port transmit clock to the *CellPath* 300 system reference clock.

2.4.3 Inter-network Connections

When a connection made through the *CellPath* 300 links two public networks (see Figure 2.3), it is necessary to select one network's clock signal or the other to be the *CellPath* 300 system reference clock. If the two networks are synchronized, CBR ports may experience problems.

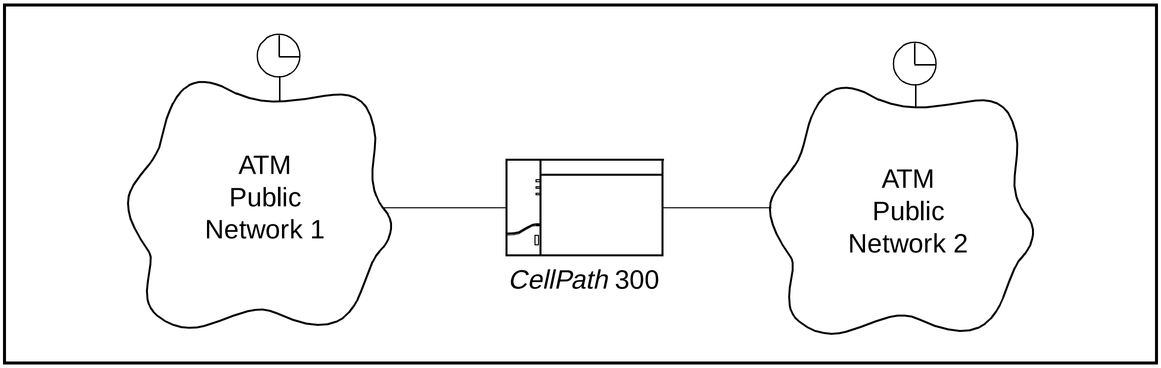


Figure 2.3 - *CellPath* 300 Linking Two Public Networks

In this example, it is assumed that the two ports that connect the *CellPath* 300 to the networks are not CBR ports. To configure this arrangement:

- Select one of the network clock signals to be the *CellPath* 300 system reference clock.
- For the port that is being used to get the network clock, set the transmit clock to use the system reference clock.
- Set the transmit clock on the port attached to the other network to loop the received clock.

2.4.4 Setting up a CBR Network

CBR networks must be synchronized end-to-end. Because of this, the transmit clocks on CBR ports are always tied to the *CellPath* 300 system reference clock. Consider an arrangement such as that of Figure 2.4.

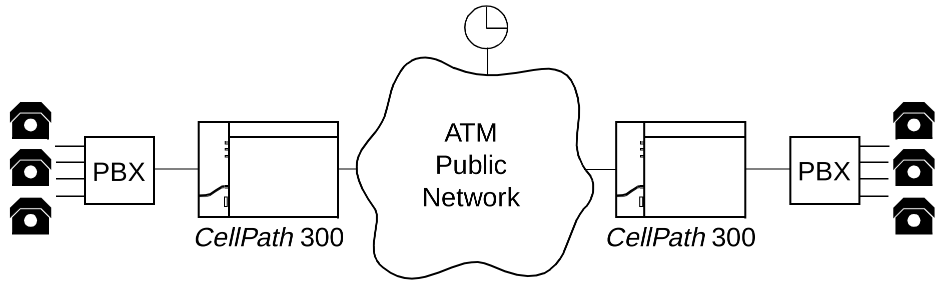


Figure 2.4 - End-to-End CBR Connection

To configure end-to-end clocking for this network:

- Set the system reference clock on both *CellPath* 300s to be the received clock from the network. The network clock now becomes the port transmit clock, since the CBR port transmit clock is always the *CellPath* 300 reference clock.
- Set the PBXs to receive their clock signals from their respective *CellPath* 300s.

CHAPTER 3 System Configuration

This chapter discusses configuration operations that apply to the *CellPath* 300 system as a whole. Topics covered in this chapter include:

- Specifying a system name, location, and contact
- Setting the system real-time clock and source reference clocks
- Setting up system passwords
- Resetting system defaults

This chapter also shows how to view the current system configuration and obtain version information about system software and hardware components.

3.1 Viewing System Settings

System-wide configuration information is viewable from two screens: the `System Configuration` screen and the `Module Information` screen.

3.1.1 Accessing the System Configuration Screen

The `System Configuration` screen (Figure 3.1) is the first screen displayed when logging into the user interface. It is at the root of the user-interface hierarchy. Lower-level screens are accessed through this screen. The `System Configuration` screen can always be returned to by selecting exit buttons (e.g., `[^OK]` or `[^Cancel]`) in the lower-level screens or by pressing the `<Esc>` key twice.

The `System Configuration` screen contains most of the information about system-wide settings. As shown in the following example, this information is presented at the top of the screen. These settings are changed by using the `System Administration` screen, as described later in this chapter.

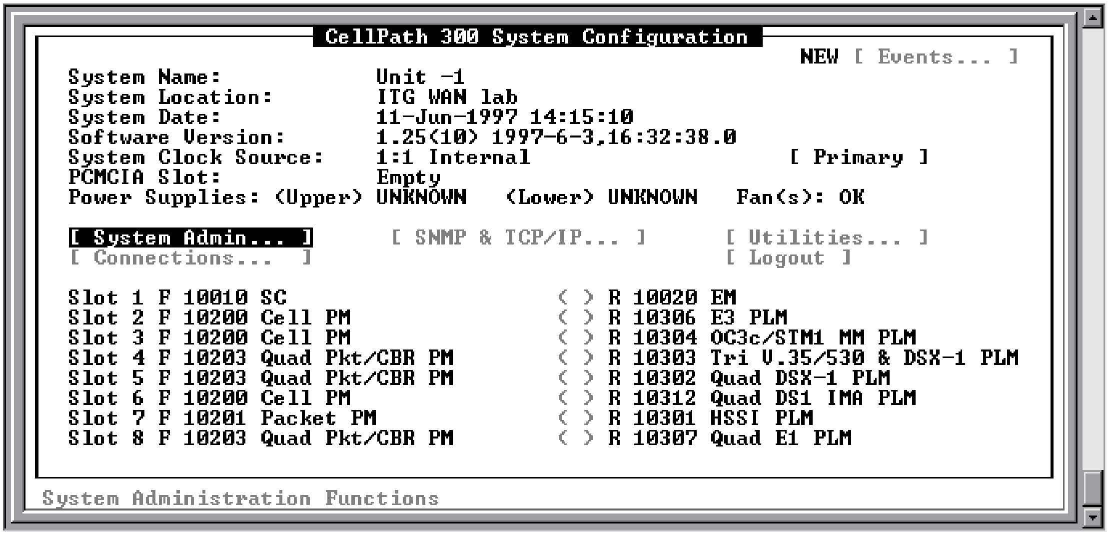


Figure 3.1 - *CellPath* 300 System Configuration Screen

The fields in the *CellPath* 300 `System Configuration` Screen are defined as follows:

System Name Name currently assigned to this *CellPath* 300. This parameter is set in the `System Administration` screen. The value of this parameter can be up to 255 characters long, but only the first 30 characters appear in the `System Configuration` screen.

System Location Location currently assigned to this *CellPath* 300. This parameter is set in the `System Administration` screen. The value of this parameter can be up to 255 characters long, but only the first 30 characters appear in the `System Configuration` screen.

System Date Current setting of the *CellPath* 300 real-time date and clock. The real-time clock is used to timestamp events and alarms.

Software Version Software version currently being run. This information is required if FORE Systems' Technical Support assistance is requested.

System Clock Source

Identifies the clock source currently being used as the *CellPath* 300 system reference clock, along with its slot and port. The slot and port are shown in the format "*slot:port*." Parameter values include the following:

Primary Reference - The primary clock source is currently being used as the system clock.

Secondary Reference - The primary clock source is not available and the *CellPath* 300 has defaulted to its secondary clock source.

Internal - Neither the primary nor secondary clock source is available, and the *CellPath* 300 has defaulted to its internal oscillator.

The primary and secondary clock sources are set up in the `System Administration` screen (see Section 3.2).

PCMCIA Slot

Identifies the PCMCIA card in the PCMCIA slot. Possible values are:

Empty - The card slot is empty.

Unrecognized - An unsupported card is inserted.

Ethernet LAN Card - A supported Ethernet LAN card is inserted.

System Software Card - A card from which software may be updated is inserted.

Power Supplies

Informs the user of the status of the power supply slots. Possible values are:

AC GOOD - An AC power supply is installed and operating normally.

DC GOOD - A DC power supply is installed and operating normally.

AC Fail - An AC power supply has failed.

DC Fail - A DC power supply has failed.

Empty - There is no power supply in this slot.

UNKNOWN - Appears at initial bootup. It is necessary to identify the power supplies installed in the chassis via the `System Administration` screen, then this field reports power supply status.

Fan Informs the user of the status of the chassis cooling fans. If a fan is failing, replace the fan tray. Possible values are:

OK - Fans are operating normally.

A Fail - Left chassis cooling fan (as viewed from the front) has failed.

B Fail - Right chassis cooling fan (as viewed from the front) has failed.

A & B Fail - Both chassis cooling fans have failed.

[System Admin...] Opens the `System Administration` screen, from which many of the system-wide configuration settings can be viewed and edited. See Section 3.2.4 for more information.

[SNMP & TCP/IP...] Opens a screen from which the *CellPath* 300 network management configuration settings can be viewed and edited. Refer to Chapter 4.

[Utilities...] Opens a screen from which several system utilities can be activated, including system reset. See Section 3.3 for more information.

[Connections...] Opens a screen where the ATM Connections list can be viewed. This screen displays all connections currently configured on the *CellPath* 300. Buttons on that screen allow adding Unicast or Multicast connections, or to edit or view existing connections.

[Logout] Logs out of the *CellPath* 300 user interface.

Slot These fields serve two purposes. First, they inform the user of which PMs and PLMs are installed, and secondly, they allow access to the individual port configuration screens. To do this, move the cursor to the line for a card slot to configure or examine, then press the <ENTER> key. Refer to Chapter 5.

3.1.1.1 Card Slots

These eight lines describe the contents of the eight slots in the *CellPath* 300 chassis. Slot 1 always contains the System Controller module and the Extension module. The other seven slots may contain protocol / physical layer module pairs, or be empty.

If the *CellPath* 300 detects a module configuration change or error, one of the following messages is displayed where the module's identification would normally be:

Empty	Appears when a protocol module slot is not configured.
! Removed *module*	Appears when the *CellPath* 300 detects that a previously installed module has been removed.
! PM Configuration Mismatch	Appears when one protocol module is replaced with a protocol module of a different type, which is incompatible with the paired physical layer module.
! PLM Configuration Mismatch	Appears when a physical layer module is replaced with a physical layer module of a different type, which is incompatible with the paired protocol module.
! Unsupported PLM ID = *id*	Appears when the physical layer module is incompatible with the current revision of system software.
! Unsupported PM ID = *id*	Appears when the protocol module is incompatible with the current revision of system software.
! Invalid PM/PLM combination	Appears when the protocol and physical layer modules in the slot are not compatible with each other.
! Failed PM or PLM	Appears when the *CellPath* 300 detects a failure on the installed module.
! No Bandwidth Available	Appears when too many high-bandwidth PM / PLMs are installed and no input bandwidth is available to support the modules installed in the slot.
! Revision Mismatch	Appears when the module installed is the correct type, but is an older version that does not support some setting which has been configured for this slot. This may occur if a newer module has been replaced by an older spare module.

3.1.2 Replacing Modules

When replacing one module (protocol or physical layer) with a module of a different type, the following messages appear on the user interface screen. When replacing modules, always follow the instructions in the *CellPath 300 ATM WAN Multiplexer Installation and Maintenance Manual*.

- When first removing a module, the user interface displays the `System Configuration` screen, and the message "! Removed *module*" appears in the `System Configuration` screen for that slot.
- When re-filling the slot with a different module, the message "! PM configuration mismatch" or "! PLM Configuration Mismatch" appears in the `System Configuration` screen for that slot.
- When selecting the slot with the new module from the `System Configuration` screen, a dialog box appears on the screen. This dialog box warns that all connections to the old module are being deleted, and that the port needs to be re-configured. Either confirm the change and delete the old connections, or replace the new module with the one that was in that slot previously.

3.1.3 Removing Modules

Use the following procedure to remove a module and return the slot to its empty state:

1. When the module is first removed, the user interface displays the `System Configuration` screen, and the message "! Removed *module*" appears in the `System Configuration` screen for that slot.
2. Press the `<ENTER>` key. A dialog box appears, informing that the module has been removed.
3. Select `Confirm` to delete any connections assigned to the slot and return it to its empty state.

3.2 Changing System Settings

The `System Administration` screen, shown in Figure 3.2, is used to alter system-wide settings.

3.2.1 Accessing the Screen

To access this screen, select the `[System Admin...]` button on the `System Configuration` screen.

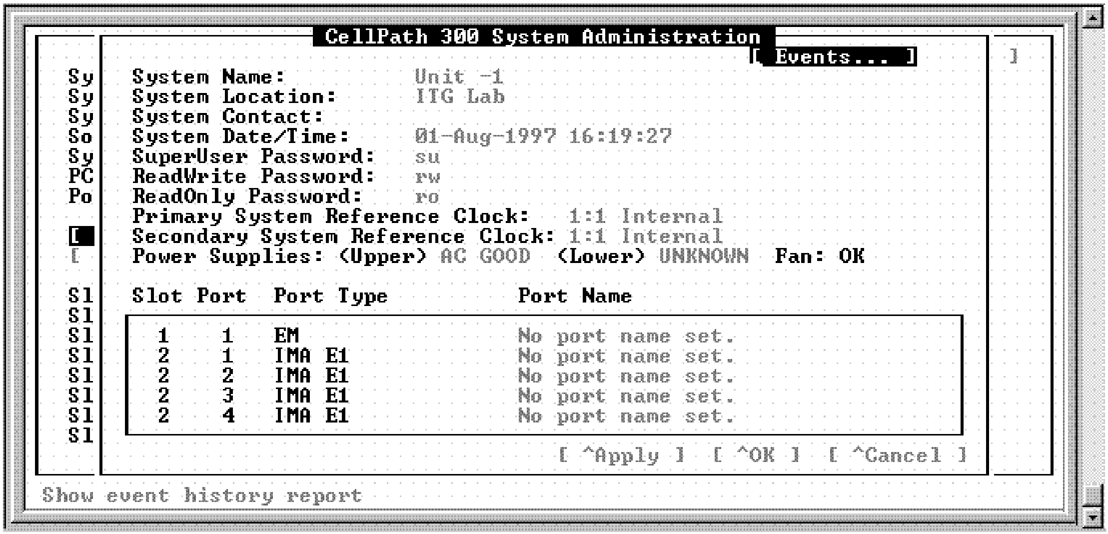


Figure 3.2 - *CellPath* 300 System Administration Screen

System Configuration

3.2.2 Setting System Information

These are the System Name, System Location, System Contact, and System Date/Time fields. The first three are alphanumeric strings of up to 255 characters; the text is scrollable left to right in the System Administration screen, but is truncated to 30 characters when displayed in the System Configuration screen. The Date/Time is any valid date and time entered in 24-hour format (dd-mm-yy hh:mm:ss).

System Name	Defaults to “No system name set.”
System Location	Defaults to “No system location set.”
System Contact	Defaults to “No system contact set.”
System Date/Time	Defaults to “01-Jan-1994 00:01:00.”

The date and time are used to timestamp event occurrences in the *CellPath* 300 reports.

3.2.3 Setting Passwords

The *CellPath* 300 provides three access levels to its user interface: super user, read / write, and read-only. Each access level is secured with a password. A password must be entered to log into the system.

Table 3.1 describes the privileges granted by the three access levels. The default values for the access levels are:

SuperUser	Defaults to “su”
ReadWrite	Defaults to “rw”
ReadOnly	Defaults to “ro”

Password values can be changed if logged in as super user. The passwords can be up to 31 characters long. The new passwords are put into effect when either the [^Apply] or [^OK] button is selected.

Password values only appear on the display when the user is logged in as super user. Otherwise the password fields are blank.

Table 3.1 - Access Levels and Privileges

Level	Privileges
SuperUser	Allows access to all *CellPath* 300 functions.
ReadWrite	Allows access to all *CellPath* 300 functions except password settings, SNMP community strings, system resets, and software updates.
ReadOnly	Allows read access to *CellPath* 300 screens and reports (except password settings and SNMP community strings), but cannot change any configuration settings.

3.2.4 Setting the System Reference Clocks

The *CellPath* 300 system reference clock times internal operations and provides the transmit clock for the data ports. The system clock can be referenced to an external clock recovered from the incoming bit stream at a specified port or it can be referenced to the *CellPath* 300 internal oscillator. Typically, the system clock is referenced to an external source if the *CellPath* 300 is connected to either a public or private network that supplies timing. Use the *CellPath* 300 internal oscillator if the *CellPath* 300 supplies timing for the network.

Set up both primary and secondary system clock sources. The *CellPath* 300 reverts to the secondary clock source if the primary clock source is lost. If both the primary and the secondary clock sources are lost, the *CellPath* 300 reverts to its internal oscillator.

The *CellPath* 300 automatically reverts back to the primary clock source or secondary clock source as they again become available (an exception is noted below).

NOTE

For Revisions 001 or 002 physical layer modules 10303 and 10308: if the clock signal from a V.35/EIA-530 line is used as the system reference clock and the signal is lost and later recovered, the *CellPath* 300 cannot detect the recovery, and so it does not revert back to that system source. In this case, the V.35/EIA-530 line must be manually set to the system reference clock again. This problem is fixed in Revision 003 and newer modules.

When the cursor is moved to either the `Primary System Reference Clock` or `Secondary System Reference Clock` field, press the `<F2>` key or `<Ctrl-P>` to bring up a list of port choices. Each choice shows the slot, port number, and description of a possible clocking source. (The internal clock is always slot 1, port 1.) Highlight one of the clocking sources with the `arrow` keys, then press the `<ENTER>` key to select, or press the `<Esc>` key to exit without selecting. Refer to Chapter 2 for an overview of clocking.

Primary System Reference Clock
Secondary System Reference Clock

Set to derive its clock from a port or from the *CellPath* 300 internal oscillator. If the field to a port is set, the device connected to the port must supply external timing. The field defaults to the *CellPath* 300 internal oscillator.

3.2.5 Configuring the Power Supplies

When the *CellPath* 300 initially powers up, power supplies installed in the chassis must be identified. Until identified, the power supplies are "unknown" to the *CellPath* 300. Once the power supplies are identified, the *CellPath* 300 verifies.

NOTE If the supplies are not identified (i.e., the fields are left with a value of "UNKNOWN"), the *CellPath* 300 does not generate alarms (traps) for them.

Identify the power supplies by entering values in the A (upper) and B (lower) power supply fields. Values include:

AC Select this if an AC power supply is installed in this bay.

DC Select this if a DC power supply is installed in this bay.

Empty Select this if no supply is installed in this bay.

3.2.6 Setting the Port Names

Names can be assigned to each port in the *CellPath* 300 system. These names show up in the port configuration and statistics screens to make it easier to identify the ports.

Port names can be entered in this screen or in the individual port configuration screens. The names can comprise an alphanumeric string of up to 31 characters. For simplicity, select a name reflective of the port's function or of the terminal equipment attached to the port.

Within the scrollable region of the `System Administration` screen, only the port names are editable. All other fields are automatically generated by the *CellPath* 300. All port names default to "`No port name set.`"

3.3 Using System Utilities

Several utilities are available for controlling the overall state of the system. These include software controls for resetting (rebooting) the system, resetting configuration parameters to their defaults, halting the system, and updating software. Some of these utilities are restricted to super users.

3.3.1 Accessing the System Utilities Screen

To access the `System Utilities` screen (Figure 3.3), select the `[Utilities...]` button on the `System Configuration` screen.

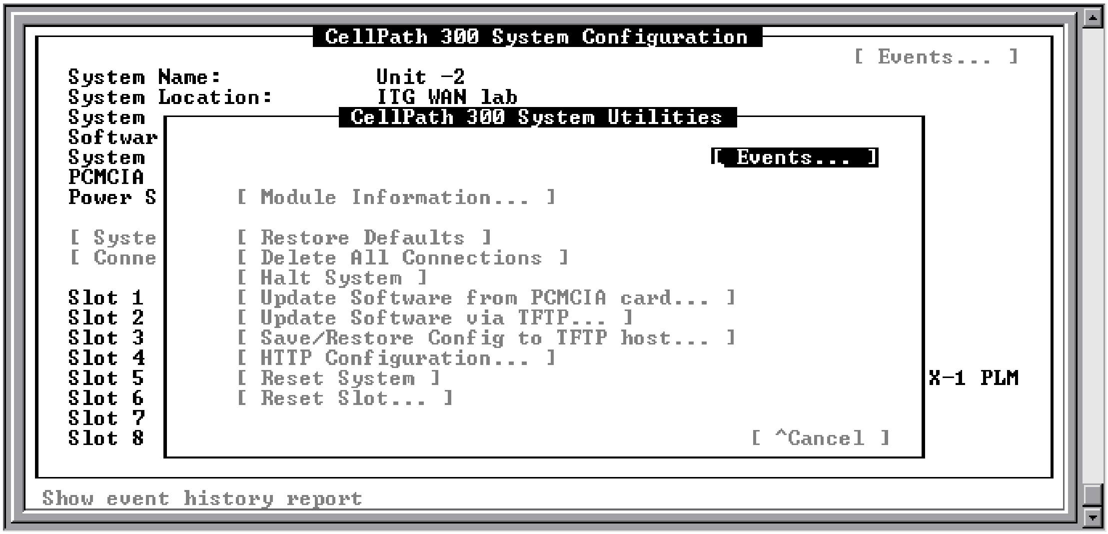
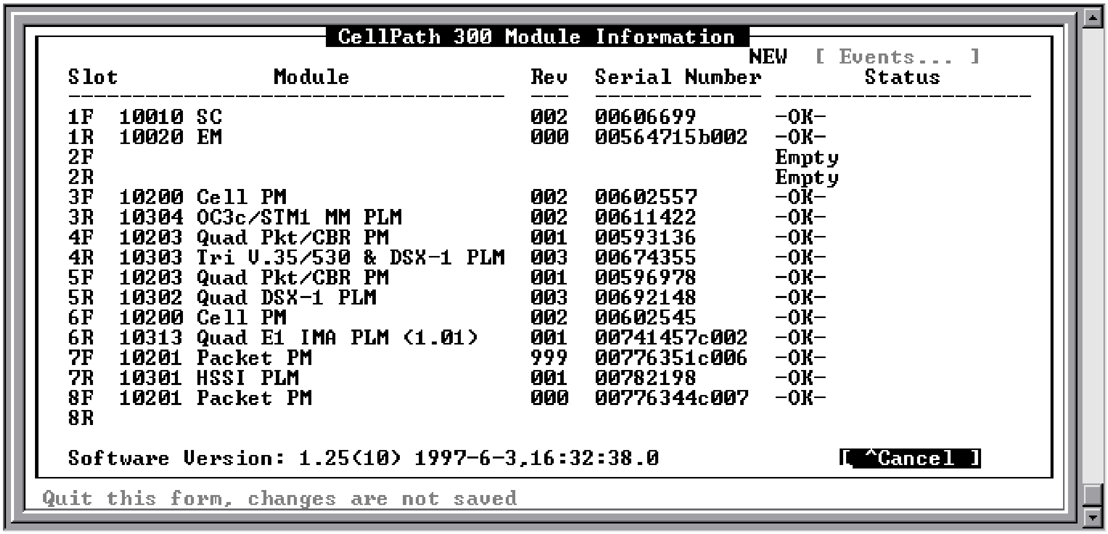


Figure 3.3 - *CellPath* 300 System Utilities Screen

3.3.2 Module Information

The `Module Information` screen provides the current revision status of the installed *CellPath* 300 hardware. This information is required if FORE Systems' Technical Support is contacted.

To access the `Module Information` screen, open the `System Utilities` screen. In the `System Utilities` screen, select the `[Module Information...]` button. A screen similar to the one shown in Figure 3.4.



CellPath 300 Module Information

NEW [Events...]

Slot	Module	Rev	Serial Number	Status
1F	10010 SC	002	00606699	-OK-
1R	10020 EM	000	00564715b002	-OK-
2F				Empty
2R				Empty
3F	10200 Cell PM	002	00602557	-OK-
3R	10304 OC3c/STM1 MM PLM	002	00611422	-OK-
4F	10203 Quad Pkt/CBR PM	001	00593136	-OK-
4R	10303 Tri V.35/530 & DSX-1 PLM	003	00674355	-OK-
5F	10203 Quad Pkt/CBR PM	001	00596978	-OK-
5R	10302 Quad DSX-1 PLM	003	00692148	-OK-
6F	10200 Cell PM	002	00602545	-OK-
6R	10313 Quad E1 IMA PLM (1.01)	001	00741457c002	-OK-
7F	10201 Packet PM	999	00776351c006	-OK-
7R	10301 HSSI PLM	001	00782198	-OK-
8F	10201 Packet PM	000	00776344c007	-OK-
8R				

Software Version: 1.25(10) 1997-6-3,16:32:38.0 [^Cancel]

Quit this form, changes are not saved

Figure 3.4 - *CellPath* 300 Module Information Screen

CAUTION

The following operations—restoring default settings, deleting connections, resetting the system, halting the system, or updating software—all cause a disruption in service.

3.3.3 Restoring Defaults

The `[Restore Defaults]` button returns all user-configurable items, including system-wide parameters and configurable port parameters, to their factory default settings. It also deletes all connections and reboots the *CellPath* 300. In-band and Ethernet connections are lost.

When this button is selected, a confirmation screen appears on the screen. The reset can be canceled at that time or continue.

3.3.4 Deleting Connections

The `[Delete All Connections]` button deletes all connections, including in-band IP connections to the System Controller. If the user interface is accessed through an in-band connection, selecting this button disrupts the in-band link. It does not disrupt user interface sessions logged in at the communications port. A dialog box appears, asking confirmation to do this.

3.3.5 Halting the System

If it is necessary to shut down the *CellPath* 300 for any reason, for example to replace a System Controller or Extension module, it is best to “halt” the system before removing power. This results in a controlled shutdown. When halting the *CellPath* 300, the following occurs:

- All users are logged out of the system.
- Synchronizes the system FLASH memories and the nonvolatile configuration database (CDB) so that they all contain the most recent configuration changes.
- Stops data flow within the system.

If the system is not halted before removing power, configuration changes made within the last 60 to 90 seconds may not be saved.

NOTE

The system can only be halted via a terminal connected to the *CellPath* 300 communication port. A halt can not be executed during a Telnet session since doing so might disconnect the Telnet link.

Once the system is halted, power to the *CellPath* 300 must be recycled or the `Reset` button on the System Controller module must be pressed in order to reboot the *CellPath* 300.

3.3.6 Updating Software

The *Cellpath* 300 provides two means of updating the operating system; Update Software from PCMCIA card and Update Software via TFTP. The following paragraphs discuss these two methods.

3.3.6.1 Update Software from PCMCIA Card

The `[Update Software from PCMCIA card]` button, accessible from the `System Utilities` screen (Figure 3.5), is used for downloading operating software upgrades from an installed PCMCIA card.

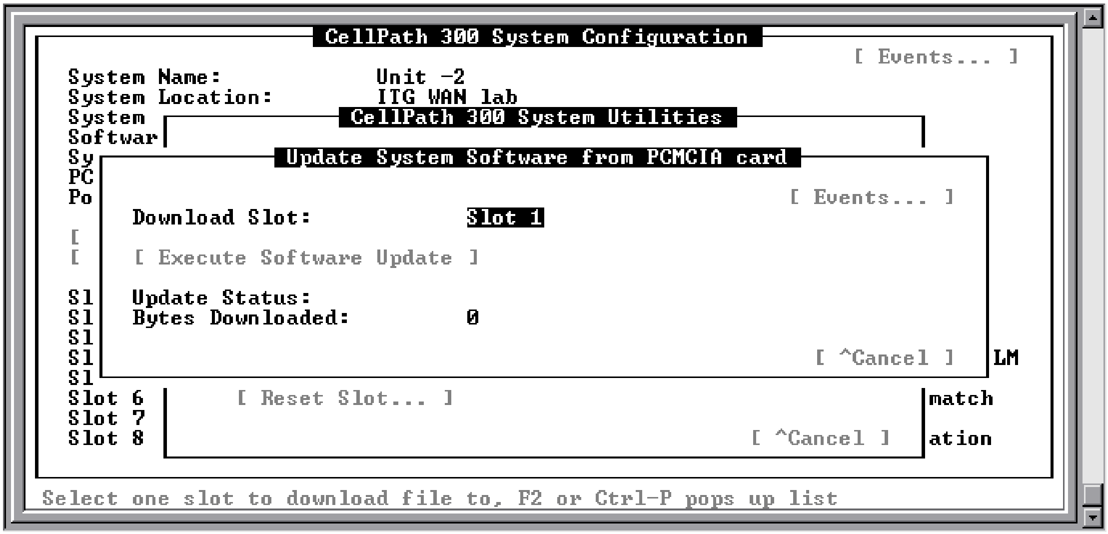


Figure 3.5 - Update Software from PCMCIA Card Screen

The slot to which the software is to be downloaded must be specified. If slot 1 is specified, then the system software is downloaded; if any other slot is specified, then the IMA flash code is downloaded. Currently, only the IMA modules contain flash. This operation is prohibited if the slot number specified does not contain an IMA module.

Procedures for using this option are provided with the instruction sheets accompanying the software upgrade.

Use the `[Save Config to PCMCIA Card]` button to save the system configuration to a PCMCIA card. This capability is a new feature of the *CellPath* 300 and applies to Software Version 1.2 and later releases.

3.3.6.1.1 Saving the Configuration

Perform the following steps to save the current *CellPath* 300 configuration database to a PCMCIA card:

1. Insert the memory card into the PCMCIA slot on the rear panel of the Extension Module.
2. From the `System Utilities` screen, select `[Save Config to PCMCIA Card]` and press `<ENTER>`.

The save operation takes approximately one minute.

3.3.6.1.2 Restoring the Configuration

Perform the following steps to restore the *CellPath* 300 configuration database from a PCMCIA card:

1. Install the PCMCIA card with the saved configuration into the PCMCIA slot on the rear of the Extension module.
2. Set System Controller DIP switch 3 to the `Up` (towards the right) position
3. Reset the system using the `Reset` button of the System Controller module or the `[Reset System]` button on the `System Utilities` screen.
4. From the list of configuration options that appears, select `C` to restore configuration from the PCMCIA card.
5. When prompted to reset DIP switch 3 to its default position, reset the DIP switch to its `down` (towards to the left) position. This switch must be reset in order for the *CellPath* 300 to continue with the reboot procedure.

After the reboot, log into the *CellPath* 300 in the normal manner.

3.3.6.2 Update Software via TFTP

The [Update Software via TFTP] button, accessed from the System Utilities screen (Figure 3.3), is used for downloading operating software upgrades via Trivial File Transfer Protocol (TFTP). This capability is a new feature of the *CellPath* 300 and applies only to Software Revision 1.15 and later releases. The software update can be obtained from FORE Systems, Inc. Copy the source files onto a local file server that has TFTP capability.

Pressing this button opens the Update System Software via TFTP screen, shown in Figure 3.6.

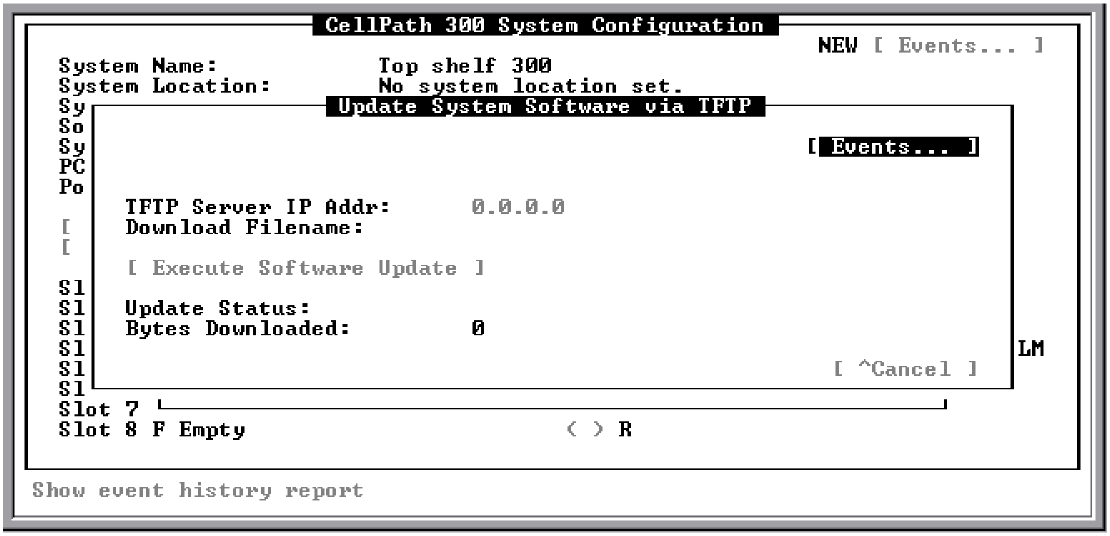


Figure 3.6 - Update System Software via TFTP Screen

Be careful when copying new software to the *CellPath* 300, to ensure that a current version of software is not overwritten.

The *CellPath* 300 has two FLASH memory banks for storing the operating software; bank 0 and bank 1. When installing new software, both the newly installed version and the older version are stored in flash memory. If executing in FLASH bank 0, the Update Software operation overwrites FLASH bank 1, and vice versa. It is possible to switch between the two flash banks. The Update Software operation always replaces the version of software not currently being run.

3.3.6.2.1 Saving/Restoring Configuration

An entire *CellPath* 300 configuration file can be saved to or restored from a remote host using TFTP over the *CellPath* 300 Ethernet interface or through an in-band management connection. The configuration can be saved or restored from any host capable of being a TFTP client. The process of saving a configuration is transparent to the network traffic flowing through the *CellPath* 300. Restoring a configuration, however, causes a momentary service outage while the *CellPath* 300 reboots and reloads the new configuration. The outage is on the order of 15 to 30 seconds.

Save or restore a configuration using the `Save / Restore Configuration to remote TFTP Host` screen (Figure 3.7) which is accessed by selecting the `[Save/Restore Config to TFTP host...]` button on the `System Utilities` screen.

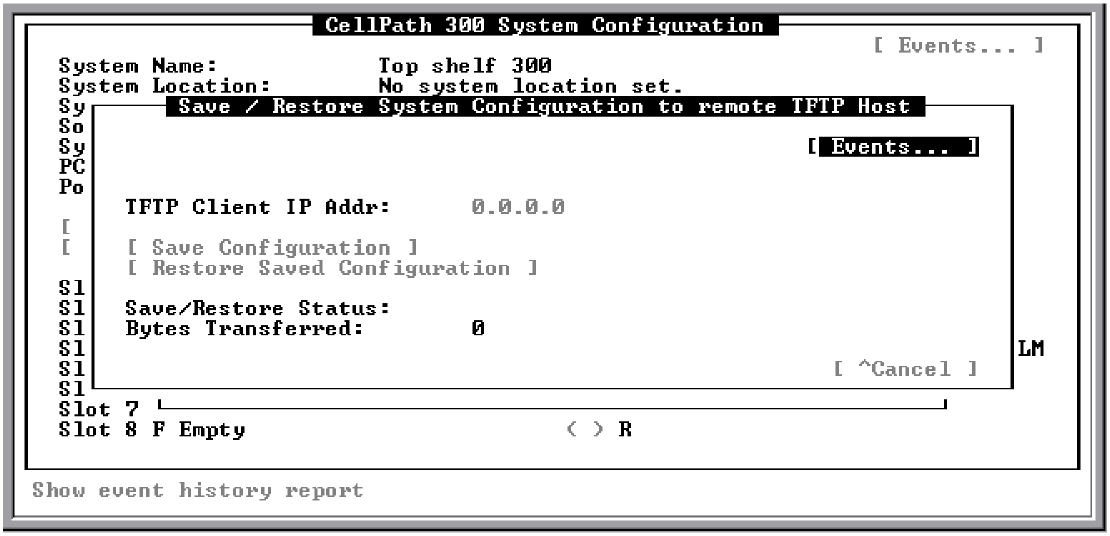


Figure 3.7 - Save / Restore System Configuration to Remote TFTP Host Screen

To save or restore a configuration, enter the client workstation or PC's IP address and select either the `[Save Configuration]` or `[Restore Saved Configuration]` button, respectively. A warning screen appears asking to confirm the operation. Select `[Confirm]` to proceed.

Next go to the client workstation or PC and start a TFTP session. Connect to the *CellPath* 300 and perform a TFTP "get" command (save configuration) or TFTP "put" command (restore configuration) to upload or download the configuration file. The *CellPath* 300 times out after 120 seconds if the TFTP "get" or "put" is not executed and the transaction is terminated. The examples described in the following paragraphs were performed on a Sun workstation. The workstation and software may differ, so refer to the computer and software documentation as needed.

3.3.6.2.1.1 Saving the Configuration

Select `[Save Configuration]`, then select `[Confirm]` when the warning screen appears.

Next go to the client workstation or PC and execute the following commands:

```
myhost:> tftp 192.228.65.37
tftp> get myconfig
Received 1319 bytes in 0.3 seconds
tftp> quit
myhost:>
```

3.3.6.2.1.2 Restoring the Configuration

Select the `[Restore Saved Configuration]` button and select `[Confirm]` when the warning screen appears.

Next go to the client workstation or PC and execute the following commands:

```
myhost:> tftp 192.228.65.37
tftp> put myconfig
Sent 1370 bytes in 0.4 seconds
tftp> quit
myhost:>
```

NOTE

In both Examples, the IP address entered with the “tftp” command is the IP address of the *CellPath* 300 on which the save or restore configuration operation is being performed.

WARNING!

Restoring a configuration causes an automatic reboot of the *CellPath* 300 so that it can load its new configuration. This results in a service outage of approximately 15 to 30 seconds while the old configuration is cleared and the new configuration is loaded. If the *CellPath* 300 has been accessed via Telnet over the Ethernet interface or through an in-band connection, reconnect and login again to the *CellPath* 300 after restoring a configuration.

WARNING!

Restoring the wrong configuration may cause the *CellPath* 300 to lose contact if accessing the *CellPath* 300 through Telnet over the Ethernet interface or through an in-band connection. Should this happen, it is necessary to access the *CellPath* 300 with a terminal or modem through its front-panel Comm port and manually restore sufficient configuration to allow contact with the TFTP client host. Then the proper configuration file can be downloaded to restore service.

The *CellPath* 300's configuration files are saved in an ASCII clear text format. This format is human-readable, and can be viewed to examine the configuration of the *CellPath* 300. However, do not edit the file since its contents are verified using the checksum contained at the end. Any modification of the file causes the checksum to fail and the configuration rejected.

3.3.7 HTTP Configuration

Selecting the {HTTP Configuration...] options provides the ability to redirect Hypertext Transfer Protocol (HTTP) queries to a server. This option can be used to allow the *CellPath* 300 to emulate web server functionality and is documented in greater detail in the FORE Systems *ForeView Device Manager User's Manual.*

3.3.8 Resetting the System

The `[Reset System]` button resets the *CellPath* 300. The reset process disrupts traffic through the *CellPath* 300 for 15 to 20 seconds. A system reset also closes all open user interface sessions, but configuration and connection information is not lost.

The C*ellPath* 300 default is to reset using its most recent version of operating software and its most recently saved configuration database (CDB). A dialog box appears requesting confirmation to do this.

3.3.9 Resetting Slots

In rare circumstances, a module in the *CellPath* 300 may encounter a problem in which the solution is to simply "reset" a module. This option allows resetting modules without having to remove and then reinsert the failing module. Selecting `[Reset Slot...]` performs a soft reset of the PM/PLM pair to either the present configuration or factory defaults.

NOTE

Setting the slot to factory defaults erases all connections relating to the PM/PLM pair being reset.

CHAPTER 4 Configuring Remote Access

This chapter describes the procedures necessary to configure the *CellPath* 300 so it can be accessed remotely for network management. Topics covered in this chapter include:

- Overview
- Configuring Ethernet interface
- Configuring in-band interface over an ATM network
- Additional in-band connection concerns
- Setting the default router
- Setting SNMP community strings
- Configuring remote access security
- Configuring the trap destinations list

4.1 Overview

The *CellPath* 300 can be accessed remotely over an Ethernet or an in-band ATM AAL5 connection (Figure 4.1). The Ethernet card provides access over a LAN. The in-band connection provides access from any IP management station on the ATM network. Depending on the method used, there are various ways to secure the *CellPath* 300 against unauthorized access.

The *CellPath* 300 can be configured for both of these access routes with up to 32 in-band connections on up to 10 separate subnets (though only one user at a time may be logged in remotely).

Configuring remote access allows the following:

- Remote access to the user interface using Telnet.
- Access the comprehensive suite of SNMP MIBs using an SNMP manager (the supported MIBs are MIB II, the DS1/E1 MIB, the DS3/E3 MIB, and an enterprise MIB).
- Receive SNMP traps when error conditions occur.

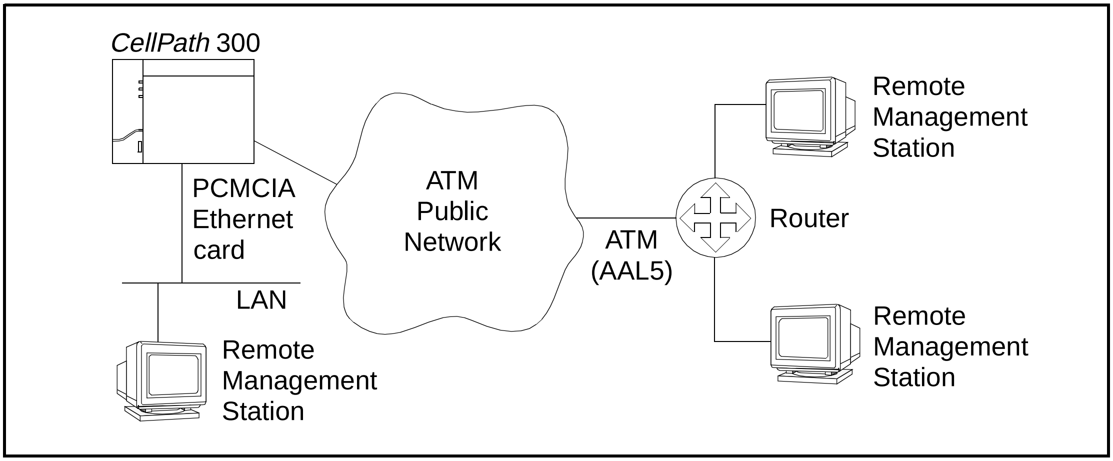


Figure 4.1 - Remote Connection Type

4.1.1 Security and Remote Access

As a highly secure TCP/IP host, the *CellPath* 300 provides security through password protection (in both the user interface and the SNMP community strings), IP screening, and Ethernet address screening.

4.1.1.1 Password Protection

When logging in either locally through the serial port, or remotely through Telnet, the user is prompted for the user interface access password.

When SNMP information is set or retrieved, the community strings in the SNMP packets and in the *CellPath* 300 must match. If not, the SNMP packet is refused.

4.1.1.2 Ethernet and IP Address Screening

Ethernet screening can be used on connections coming in through the PCMCIA Ethernet card. When Ethernet screening is enabled, the *CellPath* 300 checks the Ethernet source address of each packet destined for the System Controller. If the source address is not in the list of allowed hosts, the packet is discarded.

IP screening can be used on traffic coming in through the PCMCIA Ethernet card and on traffic coming in through in-band ATM connections. When IP screening is enabled, the *CellPath* 300 checks each IP datagram destined for the System Controller to see if the IP source address is in the list of allowed hosts. If the source address is not in the list, the IP datagram is discarded.

Both Ethernet and IP screening can be activated simultaneously, in which case packets must first pass through the Ethernet screening, then through IP screening, and finally through the password protection.

Figure 4.2 and Figure 4.3 the screening and IP datagram must pass through depending on the access type.

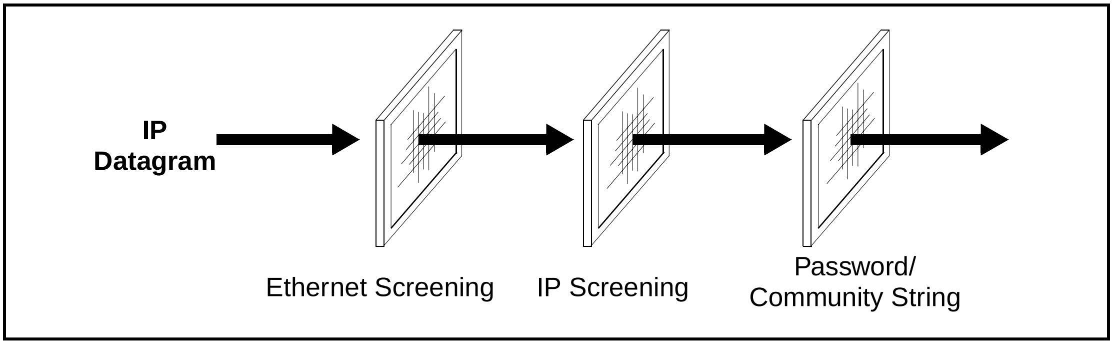


Figure 4.2 - Security Screening for Ethernet Connections

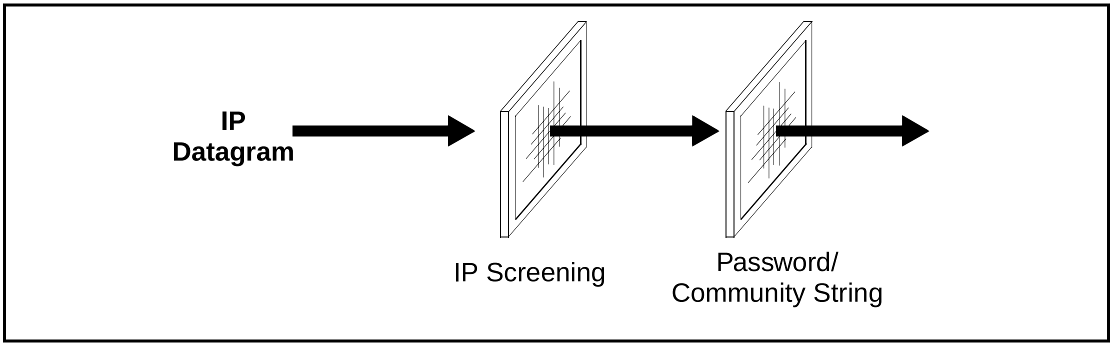


Figure 4.3 - Security Screening for In-band ATM Connections

4.2 Configuring the Ethernet Interface

To configure Ethernet access, an IP host address and subnet mask must be assigned to the *CellPath* 300 PCMCIA Ethernet card. The IP host address is used for communication between the *CellPath* 300 and Ethernet hosts.

Use the `SNMP & TCP/IP Management` screen (Figure 4.4) to configure the PCMCIA Ethernet interface on the *CellPath* 300. To access the `SNMP & TCP/IP Management` screen, select the `[SNMP & TCP/IP...]` button on the *CellPath* 300 `System Configuration` screen.

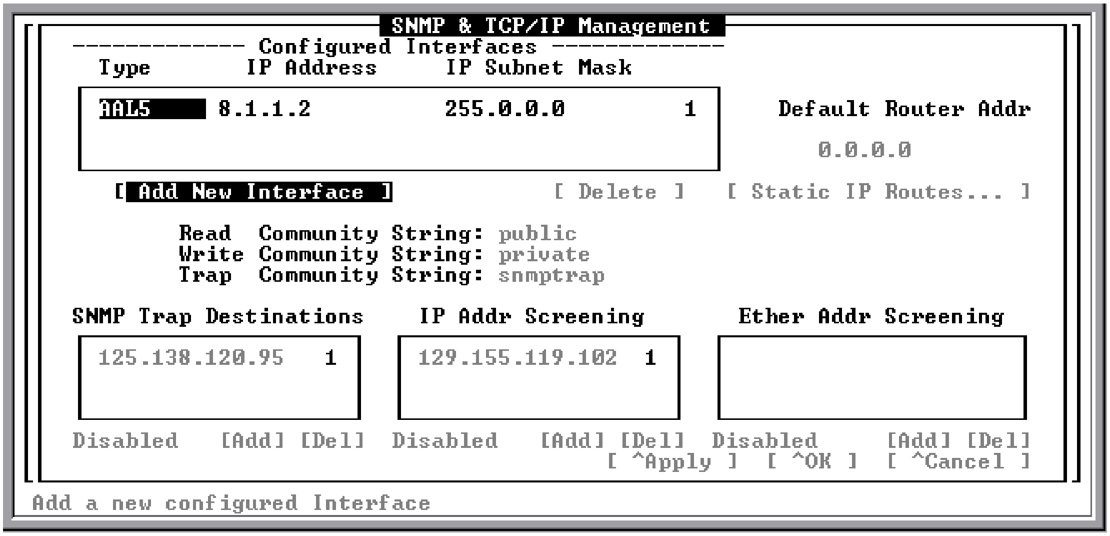


Figure 4.4 - SNMP & TCP/IP Management Screen

4.2.1 Specify the IP Address and Subnet Mask

Specify the Ethernet IP address and subnet mask using the `Configured Interfaces` field. The field contains a scrolling list of currently configured IP addresses; below the field are buttons for adding and deleting addresses from the list.

4.2.1.1 Adding an Address

To add a new IP Interface address, press the `<Tab>` key to select the `[Add New Interface]` button. The `Add New IP Interface` pop-up opens. In the fields displayed, specify the following values:

Interface Type Specify Ethernet.

IP Address Specify an address in the standard IP format.

IP Addr Mask Specify a subnet mask in the standard IP format.

Press the `<Tab>` key to advance to the `[^OK]` button in the `Add New IP Interface` pop-up. Selected `[^OK]` causes the new address to appear in the field and take effect immediately.

If the values to be used for the IP address and subnet mask are not known, check with the system administrator.

4.2.1.2 Deleting an Address

To remove an existing Ethernet IP address, select the address to be deleted in the `Configured Interfaces` field and then press the `<Tab>` key to select the `[Delete]` button. A warning is provided to the user to the fact that deleting the address may interrupt a Telnet or SNMP session if one is currently in session. The user is required to either `[Confirm]` or `[Cancel]` the action. The deletion takes effect immediately.

NOTE

The interface supporting the current session cannot be deleted. So, if the *CellPath* 300 is being accessed via Telnet over the Ethernet interface, the Ethernet interface from the `Configured Interfaces` list cannot be deleted.

4.2.2 Using Static IP Routes

Static IP routing, connectivity between multiple management stations and a single *CellPath* 300, can be set up without requiring those management stations to be accessed via the same default route. Note that with this backup redundancy, if any device or link along the access path to one management station fails, access to the other is still intact. Figure 4.5 shows an example of such a setup.

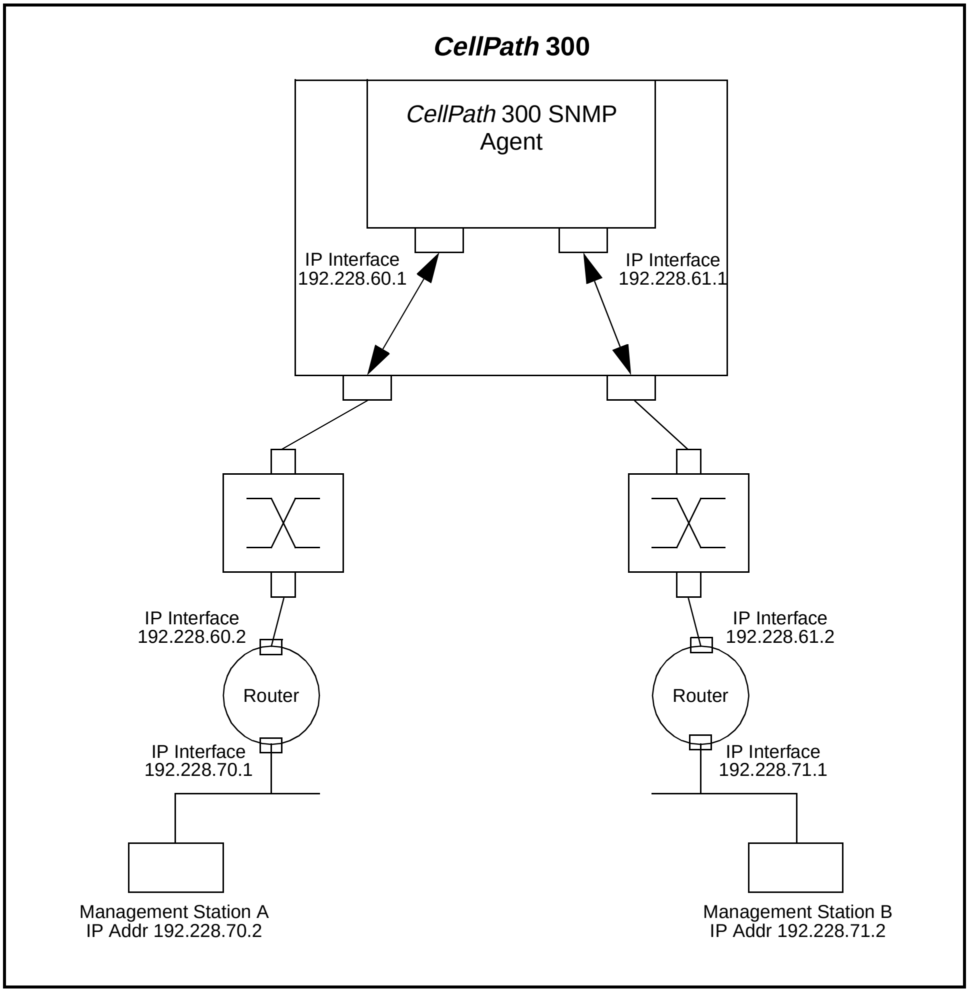


Figure 4.5 - Example of Multiple Management Stations

In this example, the *CellPath* 300 is managed from two management stations accessed via different internal IP interfaces on the *CellPath* 300. In order to successfully route IP traffic to the two management stations, appropriate static routes in the *CellPath* 300 must be configured so that it knows the correct next hop address to use. In this example, the two static routes might be configured as follows:

Destination	Subnet Mask	Next Hop	Priority
192.228.70.0	255.255.255.0	192.228.60.2	240
192.228.71.0	255.255.255.0	192.228.61.2	240

With this configuration, IP traffic to be sent to any host on the 192.228.70.0 subnet uses next hop 192.228.60.2, and IP traffic to be sent to any host on the 192.228.71.0 subnet uses next hop 192.228.61.2. The priority field is used as a metric to compare two routes in terms of the "priority" with which they should be used. The priority of a route increases with lower priority values. The *CellPath* 300 uses the convention that a route to a locally-connected IP subnet has a priority of 10, a route learned by an ICMP redirect has a priority of 30, and a static route can be given any priority ranging from 1 to 255, with a default value of 240.

Alternatively, static host routes to the IP addresses of the two individual management stations can be configured. This allows static routes that cannot be overridden by ICMP redirects if specified. Specifying a priority value less than 30 prevents any ICMP redirect from overriding the static route. Specifying a priority value of 30 or more allows an ICMP redirect to override the static route:

Destination	Subnet Mask	Next Hop	Priority
192.228.70.2	255.255.255.255	192.228.60.2	20
192.228.71.2	255.255.255.255	192.228.61.2	20

Static routes are configured by using the `Static IP Route Management` screen (see Figure 4.6). This screen is accessed by selecting the `[Static IP Routes...]` button on the `SNMP & TCP/IP Management` screen.

The `Static IP Route Management` screen lists all of the currently configured static routes, and allows new ones to be added or existing ones deleted.

To add a new static route entry, Tab to the `[Add New Static IP Route...]` button and press `<Enter>`. The `Add New Static IP Route` screen appears. Enter the appropriate information and use the `[^OK]` button to configure the route and exit the screen.

To delete an existing static route, move the cursor to the static route entry to be deleted, use the `<Tab>` key to move the cursor to the `[Delete]` button and press `<Enter>`. The static route is deleted from the list.

To edit a static route, the existing static route must be deleted and a new one added with the modified parameters. A total of 16 static routes can be configured.

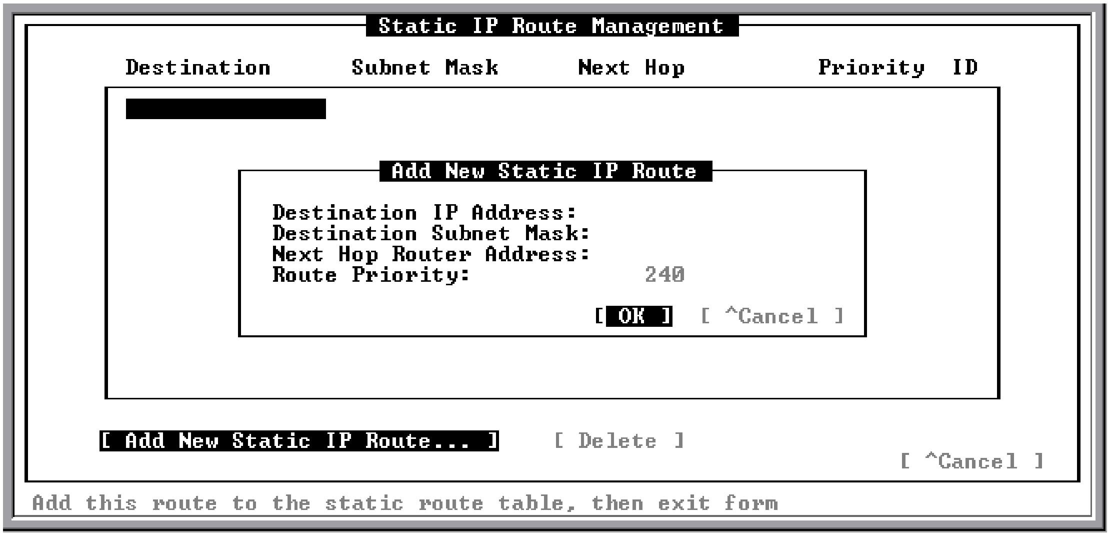


Figure 4.6 - Static IP Route Management Screen

When entering a static route, the *CellPath* 300 immediately checks to see whether or not the next hop IP address is on the same subnet as one of the *CellPath* 300's configured IP addresses. If the next hop is not on the same subnet as one of the *CellPath* 300's configured IP addresses, an error is received and the route is not added to the list. All of the *CellPath* 300 IP interfaces with appropriate IP addresses and subnet masks should be configured prior to establishing static routes.

Once the static routes have been configured, the static route for each destination is used to direct traffic to that destination. If a priority less than 30 is configured, a static route to an individual host (i.e., with a subnet mask of 255.255.255.255) is not overridden by ICMP redirects. Set the priority to any number 30 or greater if ICMP redirects are to override a static route to a host.

Destination IP Address
IP address of the network or the management station host being used to reach this static route. Use the standard dotted-decimal format for the address.

Destination Subnet Mask
Subnet mask appropriate for the IP address specified in the `Destination` field above. The *CellPath* 300 automatically calculates a subnet mask based on the Destination IP address specified. If the subnet mask is not appropriate, edit it as appropriate. Use standard dotted-decimal format.

Next Hop Router Address IP address of the router at the next hop from the *CellPath* 300. This IP address must be on the same subnet as one of the *CellPath* 300's configured IP addresses. If it is not, the address is unreachable by the *CellPath* 300 and an error is received. Configure all IP interfaces before attempting to configure static routes. The Next Hop Router IP address is entered in standard dotted-decimal format.

Route Priority A number from 1 to 255 for the route priority. If a priority of less than 30 is entered for a static route to an individual host (i.e., with a subnet mask of 255.255.255.255) the static route cannot be overridden by ICMP redirects. Enter a value of `30` or greater if ICMP redirects are to override the static route.

[^OK] Create the static route and exit the screen. Scroll the cursor to the `[^OK]` button and press `<Enter>` or use `<Ctrl-O>` to activate the `[^OK]` button.

[^Cancel] Exit the screen without creating the static route. Scroll the cursor to the `[^Cancel]` button and press `<Enter>` or use `<Ctrl-C>` to cancel the screen.

4.3 Configuring an In-band Interface

The *CellPath* 300 can establish in-band IP connections to the System Controller over ATM using AAL5 connections. This method is useful when an Ethernet port is not available for the PCMCIA Ethernet interface. To establish an in-band IP connection, the following steps are required:

- Configure an AAL5 IP interface on the *CellPath* 300
- Set up a “full mesh” of AAL5 connections between IP hosts to support IP’s connectionless routing protocols
- Set the *CellPath* 300 default router

4.3.1 Example Network

Figure 4.7 depicts a sample ATM network with two *CellPath* 300 systems. For this example, let’s assume the user wishes to create an in-band management connection from *CellPath* 300 “A” to the remote management station. To do this the following steps are required:

1. Configure an AAL5 IP interface on the *CellPath* 300.
2. Configure the necessary AAL5 connections on each IP host in the network to support the IP full mesh (as per RFC-1577).
3. Configure the *CellPath* 300 default router.
4. Configure the *CellPath* 300 trap hosts (if traps are desired).
5. Configure the *CellPath* 300 security screening options (if additional security is desired).

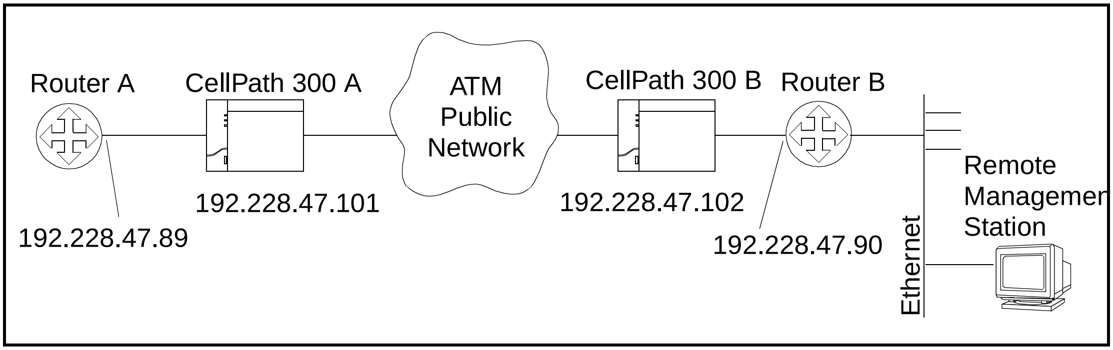


Figure 4.7 - Required IP Addresses for Configuring In-band IP Connection

Configuring Remote Access

4.3.2 Creating an AAL5 IP Interface

The first step is to assign an AAL5 IP interface to the *CellPath* 300. There can be up to ten AAL5 IP interfaces (or nine if the Ethernet interface is also being used) for connecting the *CellPath* 300 to different subnets.

To access the `SNMP & TCP/IP Management` screen, select the `[SNMP & TCP/IP...]` button on the *CellPath* 300 `System Configuration` screen.

To specify the IP address, use the `Configured Interfaces` field. The field contains a scrolling list of currently configured IP addresses; below the field are buttons for adding and deleting addresses from the list.

4.3.2.1 Adding an Address

To add the address, select the `[Add New Interface]` button. The `Add New IP Interface` pop-up opens. In the pop-up fields, specify the following values:

Interface Type	AAL5
IP Address	Specify an address in the standard IP format.
IP Addr Mask	Specify a subnet mask in the standard IP format.

When the `[^OK]` button in the `Add New IP Interface` pop-up is pressed, the new address appears in the field and takes effect immediately.

If the values to use for the IP address and subnet mask are not known, check with the system administrator.

4.3.2.2 Deleting an Address

To remove an existing AAL5 IP address, select it in the `Configured Interfaces` list and then select the `[Delete]` button. The deletion takes effect immediately.

4.3.3 Creating a “Full Mesh” of AAL5 Connections

For a *CellPath* 300 to pass its IP management traffic correctly, the ATM network needs to have what is called a “full mesh” of IP hosts. This means that there is an AAL5 connection between each of the IP hosts in the network. This full mesh allows the connectionless IP protocols to function properly. Without a full mesh, an IP host could be redirected to send packets along a route for which it does not have an AAL5 connection. This would result in a *silent discard* of packets. This is the nature of IP and is not unique to the *CellPath* 300.

The following example shows a small network involving only two routers passing IP traffic over an ATM Public Network. They are connected to the network via a pair of *CellPath* 300 systems.

To create a full mesh of AAL5 connections for this example, six connections need to be created.

These connections are shown in Figure 4.8 and summarized in Table 4.1.

Note that these six connections include the connection used for passing normal user IP traffic between the two routers, as well as the four connections used for passing *CellPath* 300 management traffic between each of the two routers and each of the two *CellPath* 300 systems. A connection is also shown between the two *CellPath* 300 systems, although there would normally be no IP traffic sent between them.

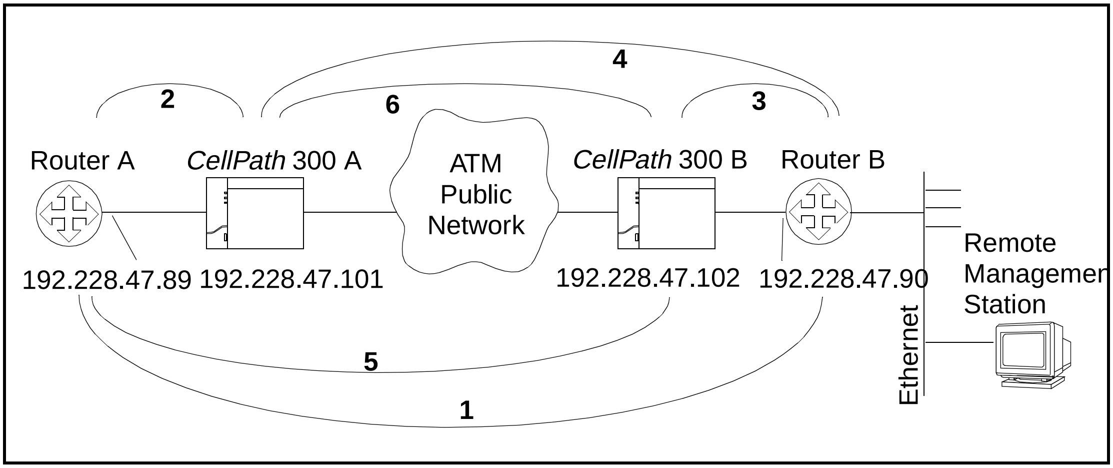


Figure 4.8 - Full Mesh of AAL5 Connections

Table 4.1 - Connections Necessary for Figure 4.8

Connection # from Figure 4.8	Device	IP Address	Device	IP Address
1	Router A	192.228.47.89	Router B	192.228.47.90
2	Router A	192.228.47.89	*CellPath* 300 A	192.228.47.101
3	*CellPath* 300 B	192.228.47.102	Router B	192.228.47.90
4	*CellPath* 300 A	192.228.47.101	Router B	192.228.47.90
5	Router A	192.228.47.89	*CellPath* 300 B	192.228.47.102
6	*CellPath* 300 A	192.228.47.101	*CellPath* 300 B	192.228.47.102

4.3.4 An Alternative to the Full Mesh

An alternative to the full mesh is to put each *CellPath* 300 on a separate IP subnet, disallowing routing protocols from changing the routing of a packet and reducing the number of connections to be configured. If *CellPath* 300 A is at IP address 192.226.9.1 and subnet 9 is only connected to Router A, no re-routing is possible. IP hosts know that packets to be sent on subnet 9 must be sent to Router A. An example network of this type is shown in Figure 4.9.

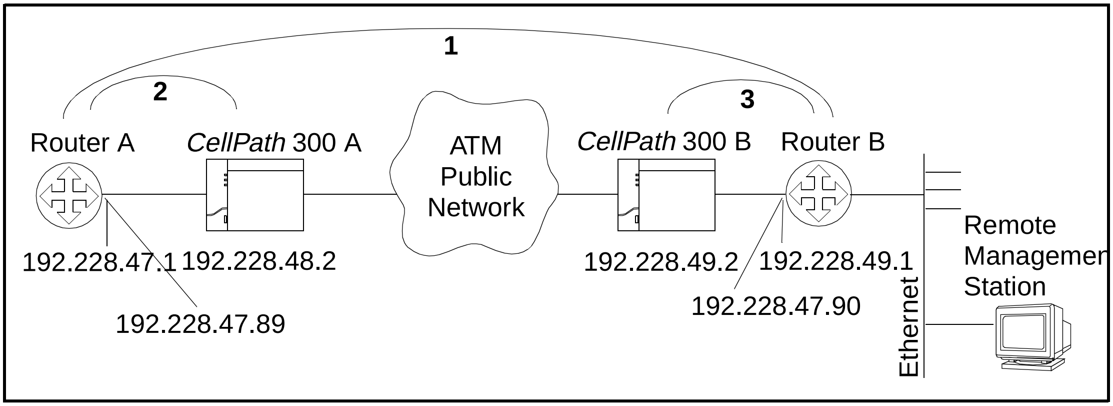


Figure 4.9 - An Alternative IP Network Configuration

In the full mesh, a total of six AAL5 connections were necessary to ensure IP connectivity between all hosts. In this alternative configuration, three AAL5 connections are sufficient.

1. There is a connection between the interfaces on Routers A and B. These two are configured for the 192.228.47.0 subnet.
2. There is a connection between *CellPath* 300 A and the interface on Router A. These two are configured for the 192.228.48.0 subnet.
3. There is a connection between *CellPath* 300 B and the interface on Router B. These two are configured for the 192.228.49.0 subnet.

In addition, only the Router A to Router B connection has to pass through the public ATM network. The disadvantages, of course, are that two additional subnets must be created, and traffic passing from one router to a remote *CellPath* 300 must first pass through the remote *CellPath* 300 to the remote router before it is then forwarded back to the remote *CellPath* 300.

See Table 4.2 for a summary of the connections necessary for this setup.

Table 4.2 - Connections Necessary for Figure 4.9

Connection # from Figure 4.9	Device	IP Address	Device	IP Address
1	Router A	192.228.47.89	Router B	192.228.47.90
2	Router A	192.228.48.1	*CellPath* 300 A	192.228.48.2
3	*CellPath* 300 B	192.228.49.2	Router B	192.228.49.1

4.3.5 Creating a Connection to the System Controller

Use the `Add New Unicast Connection` screen to create a connection to the System Controller. The connection to the System Controller is similar to a normal cross-connection on the *CellPath* 300, but with some extra parameters.

NOTE

To configure an in-band interface, the port through which the connection passes must be configured.

4.3.5.1 Accessing the Screen

To access the `Add New ATM Unicast Connection` screen (Figure 4.10), open the `Port Configuration` screen for the port through which the connection passes. Select the `[Connections]` button to open the `ATM View Connection List` screen. Next, select the `[Add Unicast...]` button to add a new in-band connection, or select the `[Edit Unicast...]` button to edit an existing in-band connection.

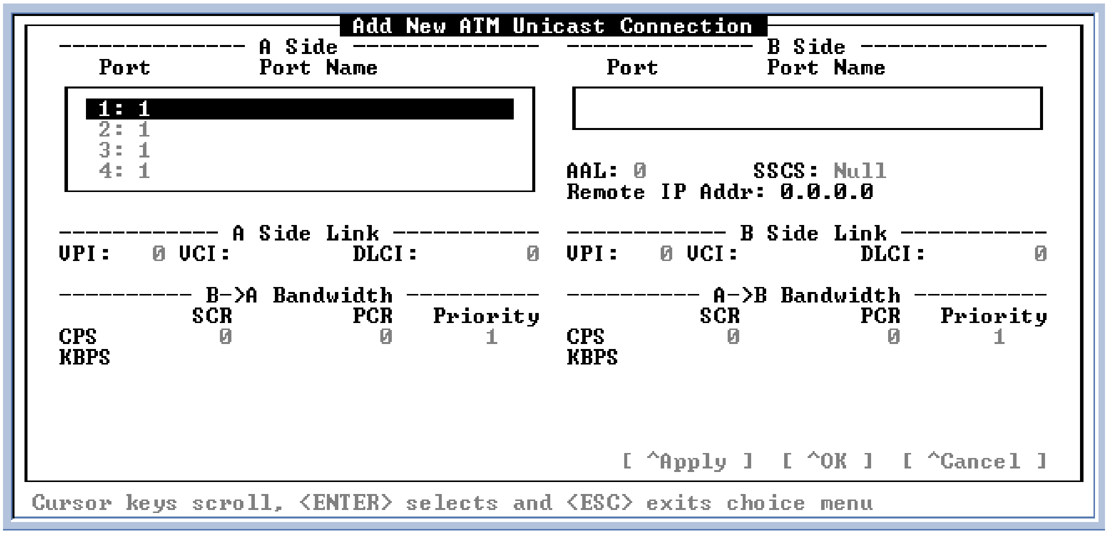


Figure 4.10 - Add New ATM Unicast Connection Screen

4.3.5.2 Configuring an In-band Connection

The fields in the `Add New ATM Unicast Connection` screen are defined as follows:

A Side Port — Select **1:1** from the list of ports (1:1 is the System Controller).

B Side Port — Specify the port through which the in-band connection passes to the remote device.

Encapsulation — The encapsulation type MUST be matched with that of the remote ATM device. If unsure of what to use, check with the administrator or carrier. Choices are as follows:

Null - Used when each higher level protocol (e.g., IP) is given its own VCC. Approved by the IETF for IP over ATM, as per RFC 1483. This is also known as VC-multiplexing.

LLC/SNAP - Used when multiplexing several higher level protocols on one VCC. Approved by the IETF for IP over ATM, as per RFC 1483.

NLPID - Used when multiplexing several higher level protocols on one VCC. Approved by the IETF for IP over Frame Relay, as per RFC 1490.

EtherType - An old non-IETF standard encapsulation type for Frame Relay. Some devices may still use it.

Unknown - Not allowed for a connection to the System Controller.

Remote IP Addr Specify, in standard IP format (*nnn.nnn.nnn.nnn*), the address of the remote management station at the endpoint of the in-band connection.

VPI/VCI Valid unique VPI/VCIs must be entered for both the System Controller side and the remote device side of the connection.

Connection Specify **VCC.**

Traffic Specify **VBR.**

AAL Specify **AAL5.**

SSCS The SSCS must match the SSCS of the remote ATM device. If unsure of what type to use, check with the system administrator or service provider for the proper type. Choices are:

Null - Use for Frame Relay Service Interworking (most common).

FR2 - Use for Frame Relay Network Interworking with 2-byte FR-SSCS headers. (The System Controller's VPI/VCI is used to compute the DLCI embedded in the FR-SSCS header).

FR4 - Use for Frame Relay Network Interworking with 4-byte FR-SSCS headers. (The System Controller's VPI/VCI is used to compute the DLCI embedded in the FR-SSCS header).

Unknown - Not allowed for a connection to the System Controller.

Sustained Cell Rate (SCR) Specify the cell bandwidth the connection is to use in time of congestion. A different value for can be specified each direction. (See *Chapter 5, Configuring Ports*.)

Peak Cell Rate (PCR) Specify the maximum allowable bandwidth for the connection. A different value may be specified for each direction. (See *Chapter 5, Configuring Ports*.)

Priority Specify the priority of the connection. A different priority may be specified for each direction. (See *Chapter 5, Configuring Ports*.)

4.4 Using Inverse ARP/Inverse ATMARP On In-band Management Connections

For in-band management connections over Frame Relay or ATM, the *CellPath* 300 now supports InARP and InATMARP. This allows routers to automatically query the *CellPath* 300 for the IP address of the management interface associated with a particular in-band management connection—it is not necessary to configure IP to connection identifier mappings within the router. The *CellPath* 300 only responds to requests produced by the router. It doesn't generate its own InARP or InATMARP requests so it is necessary to specify the Remote IP Address mapping for the connection within the *CellPath* 300. InARP is supported in compliance with the requirements of RFC 1490, while InATMARP is supported in compliance with the requirements of RFC 1577.

NOTE

To enable InARP over Frame Relay, FRLM needs to be configured in both the *CellPath* 300 and the router.

4.4.1 Additional In-band Connection Concerns

In addition to creating the in-band connection and the IP interface, there are a few more points to consider when establishing an in-band connection.

4.4.1.1 Statically Configured Connections

The *CellPath* 300 does not respond to InARP or InATMARP requests, nor does it generate such requests. For initial PVC deployment, the static mapping of remote IP addresses to the associated VPI/VCI is sufficient for most network management applications.

It is possible to add routes to the *CellPath* 300 routing table via SNMP, however, this is not possible from the user interface. If routes are added, they are not saved during a power-cycle. If additional routes are created via SNMP, and power to the *CellPath* 300 is lost, those additions must be entered again.

4.4.1.2 Encapsulation

The same encapsulation method must be used for each host in the connection. This may require additional attention because not all vendors refer to encapsulation modes in the same way. If the encapsulation type at the host is unsupported, refer to Section 4.3.5.2 for descriptions of the supported *CellPath* 300 encapsulation types, paying particular attention to the RFCs mentioned. It is likely that the host is using one of these encapsulation types.

4.4.1.3 Maximum Transfer Unit (MTU)

Both hosts must agree to not transmit IP datagrams that exceed the smaller of the two MTUs supported by the two IP / AAL5 interfaces. The current MTU for IP / AAL5 in the *CellPath* 300 is 1,468 octets.

4.4.2 Setting the Default Router

Whether configuring in-band for Ethernet access, the IP address of the default router must be specified. The default router is where the *CellPath* 300 sends IP packets which are destined for a host that is not on the same subnet as the *CellPath* 300. The default router itself must be on the *CellPath* 300 subnet.

The IP address of the default router can be configured in the `SNMP & TCP/IP Management` screen (Figure 4.11). To access this screen, select the `[SNMP & TCP/IP...]` button on the *CellPath* 300 `System Configuration` screen.

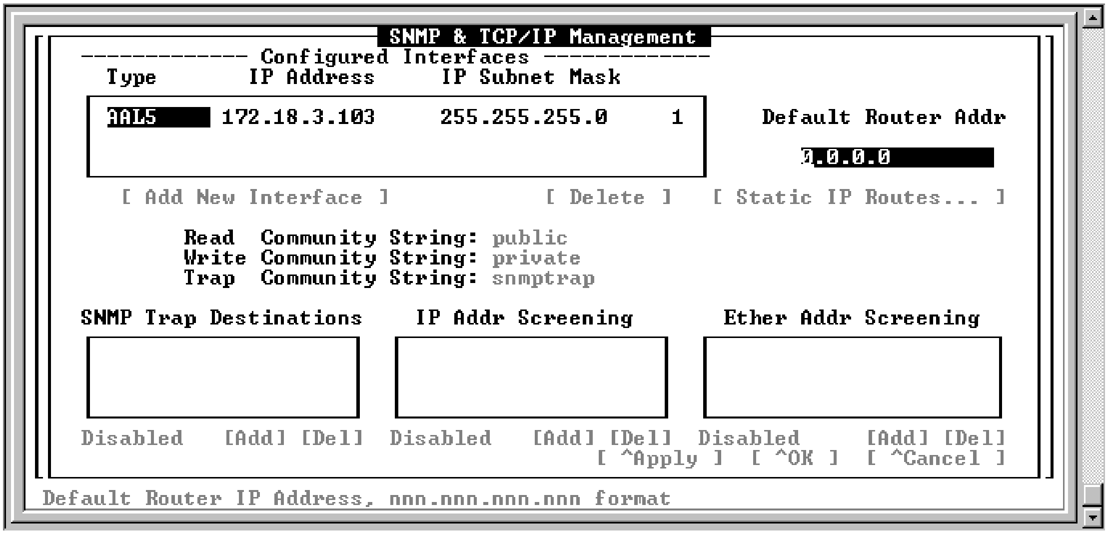


Figure 4.11 - Default Router Address Field

Use the `Default Router Addr` field to specify the address of the default router. Enter the address in the standard IP address format (`nnn.nnn.nnn.nnn`).

When the cursor is moved from the field, the *CellPath* 300 checks to make sure the address is a valid IP address. If there is an error, the cursor returns to the field and an error message is displayed.

The address specified in this field does not take effect until either the `[^OK]` or `[^Apply]` button is selected.

4.5 Setting the SNMP Community Strings

SNMP uses password-like community strings to determine if an SNMP packet should be processed. The *CellPath* 300 uses the standard default community strings, but they can be changed if SNMP access is to be restricted.

The SNMP community strings can be configured in the `SNMP & TCP/IP Management` screen. To access this screen (Figure 4.12), select the `[SNMP & TCP/IP...]` button from the *CellPath* 300 `System Configuration` screen.

NOTE Super user privileges are required to view and edit community strings.

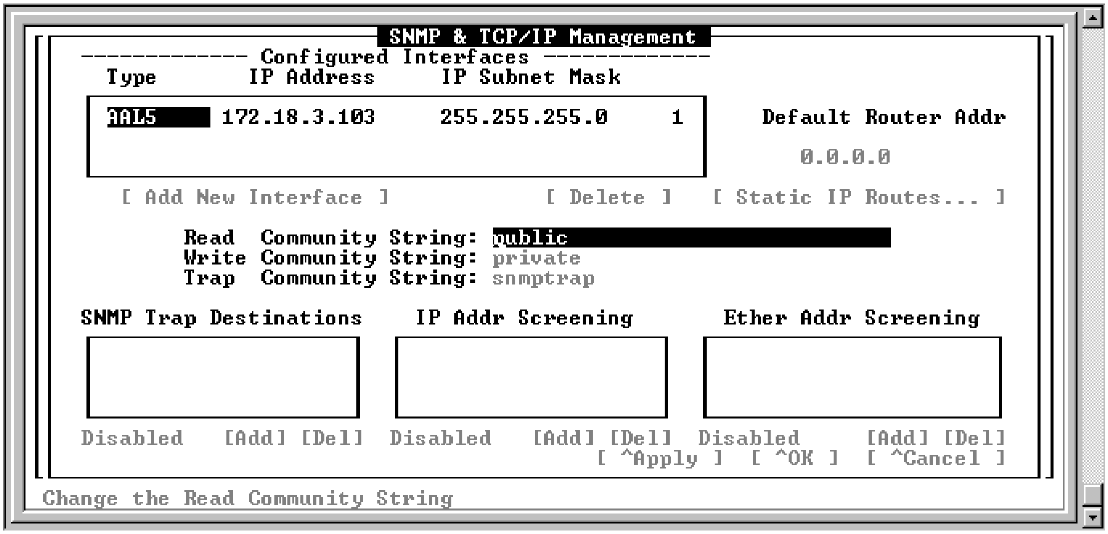


Figure 4.12 - Setting SNMP Community Strings

To change a community string, select it and type the new string (1 to 31 characters in length). If an invalid string is entered, an error message is displayed when the cursor is moved, and the cursor returns to the field. The SNMP community strings have the following meanings:

Read Controls the reading of MIB variables.

Write Controls the writing of values to MIB variables.

Trap Used by the network management application to validate that the trap is from an authorized host.

Activate the changes by selecting the `[^OK]` button or the `[^Apply]` button.

4.6 Configuring Remote Access Security

The *CellPath* 300 is secured from unauthorized remote access by user interface password protection and SNMP community strings. For additional security the *CellPath* 300 can be configured to screen out incoming packets based on the IP source address and/or source Ethernet address.

Security can be configured in the `SNMP & TCP/IP Management` screen (Figure 4.13). To access this screen, select the `[SNMP & TCP/IP...]` button on the *CellPath* 300 `System Configuration` screen.

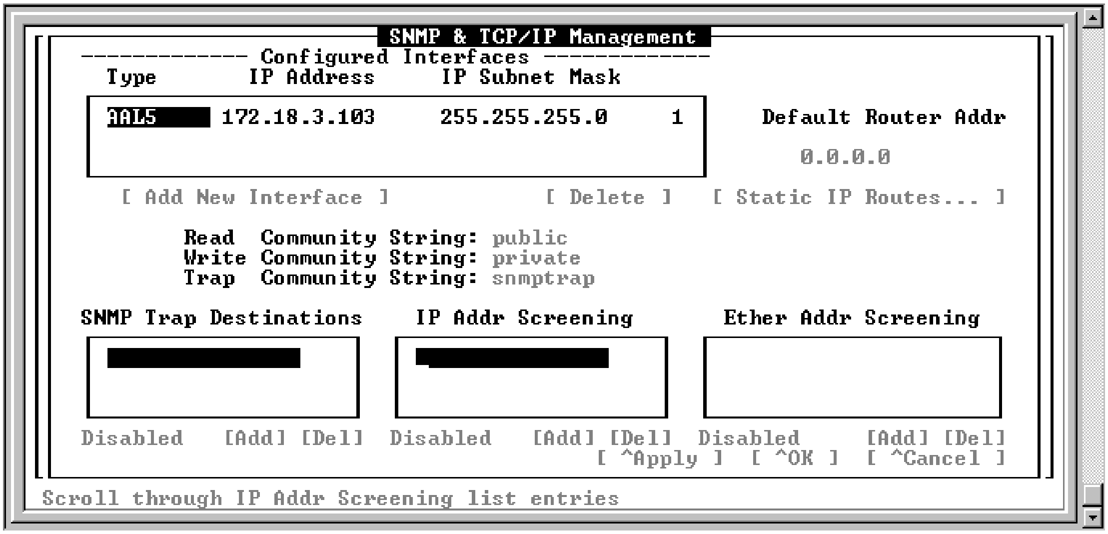


Figure 4.13 - Setting Remote Access Security

4.6.1 Configuring the IP Screening List

The `IP Addr` field lists the IP addresses of up to sixteen hosts that are allowed to access the *CellPath* 300. With IP address screening enabled, any packet from a host which is not in the screening list is discarded.

4.6.1.1 Adding a Host

Select the `[Add]` button under the `IP Addr Screening` field to add a new host to the screening list. A screen pops up in which to enter the IP address. The changes take effect when the `[^OK]` button in the pop-up is selected.

4.6.1.2 Deleting a Host

Use the [Del] button under the IP Addr Screening field to remove a host from the screening list. The changes take effect immediately.

4.6.1.3 Enabling / Disabling the IP Address Screening List

The [Enabled/Disabled] field is a toggle that allows IP address screening to be turned on and off. Changes take effect when either the [^OK] button or the [^Apply] button on the SNMP & TCP/IP Management screen is selected.

4.6.2 Configuring the Ethernet Address Screening List

With Ethernet address screening enabled, only packets from hosts on the list are accepted by the *CellPath* 300. The Ethernet Addr field lists up to sixteen Ethernet addresses of hosts that are allowed access to the *CellPath* 300.

If Ethernet address screening with IP address screening is enabled, make sure that the Ethernet addresses match up with the IP addresses. The *CellPath* 300 checks Ethernet addresses first and then IP addresses. If the IP addresses are not for the Ethernet hosts, no traffic is allowed through. Simple typographic errors here can cause a lot of problems later on.

CAUTION

If the IP address screen is mistakenly set to block the IP address of the management station the *CellPath* 300 is currently being accessed on, the connection is lost. Furthermore, the user interface task or Telnet session in use times out. If this occurs, there are various ways to regain access to the *CellPath* 300.

Connect a terminal to the *CellPath* 300 communications port and access the user interface to remove the IP address screen.

Wait for approximately 30 minutes until the existing UI/Telnet session times out. Then Telnet into the *CellPath* 300 from a management station that is not screened by the *CellPath* 300.

Reset the *CellPath* 300 and then Telnet into the *CellPath* 300 from a management station with an IP address that is not screened. This disrupts service while the *CellPath* 300 resets, but the 30 minute wait for the Telnet session to time out as with the previous method does not occur.

NOTE

The Ethernet addresses on the list must be from a host on the local Ethernet (the one connected directly to the PCMCIA slot). Including an address from a host on a remote Ethernet does not allow the remote host access to the *CellPath* 300 because the packet's Ethernet address changes when the packet leaves the originating Ethernet.

4.6.2.1 Adding a Host

The `Ether Addr Screening [Add]` button is used to add a new host to the screening list. A screen pops up in which the Ethernet address can be entered. The changes take effect when the `[^OK]` button is selected.

4.6.2.2 Deleting a Host

The `Ether Addr Screening [Del]` button removes a host from the screening list. The changes take effect immediately.

4.6.2.3 Enabling/Disabling Ethernet Address Screening List

The `[Enabled/Disabled]` field toggle allows Ethernet address screening to be turned on or off. Changes take effect when either the `SNMP & TCP/IP Management` screen `[^OK]` or `[^Apply]` button is selected.

4.7 Configuring the Trap Destinations List

The *CellPath* 300 generates SNMP traps during alarm conditions. The SNMP trap destinations list indicates the IP hosts to which traps are sent. The list can contain up to ten IP addresses, which can be entered multiple times.

SNMP trap destinations can be configured in the `SNMP & TCP/IP Management` screen (Figure 4.14). To access this screen, select the `[SNMP & TCP/IP...]` button on the *CellPath* 300 `System Configuration` screen.

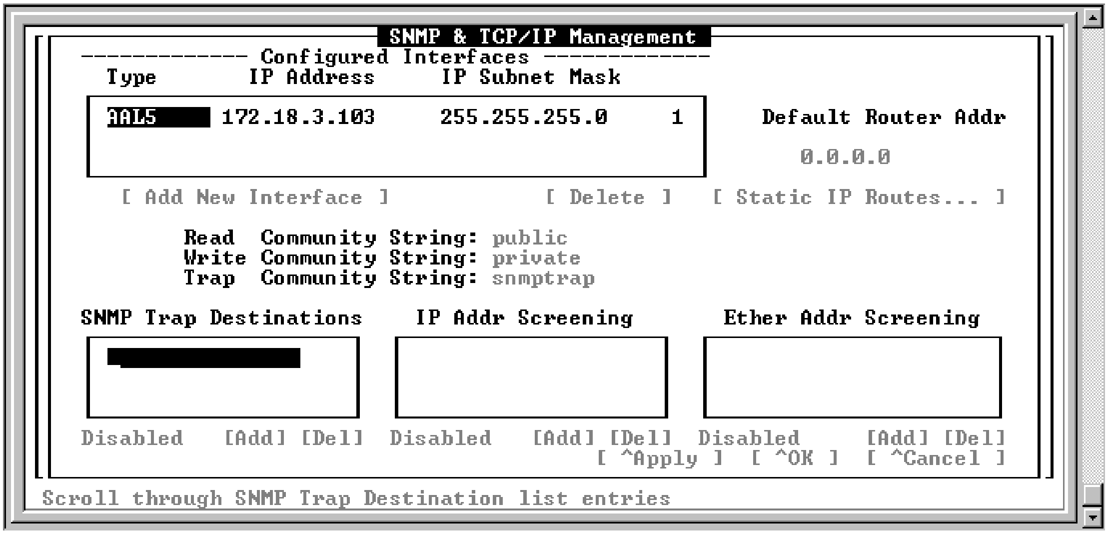


Figure 4.14 - Configuring SNMP Trap Destinations

4.7.1 Adding a Host

Select the `[Add]` button under the `SNMP Trap Destinations` field to add an IP address to the trap destinations list. A screen pops up in which an IP address can be entered. The changes take effect when the `[^OK]` button is selected.

4.7.2 Deleting a Host

Use the `[Del]` button under the `SNMP Trap Destinations` field to remove an address screen the list. The changes take effect immediately.

4.7.3 Enabling / Disabling Traps

Select the `[Enabled/Disabled]` button to enable and disable traps. If traps are disabled, the *CellPath* 300 does not issue a trap when it raises an alarm. The changes take effect immediately.

CHAPTER 5 Configuring Ports

This chapter describes how to configure the individual ports to support the physical characteristics and protocols of the lines connected to the ports. The port types are covered in the following order:

For information on configuring ATM virtual port connections, refer to Chapter 6.

For information on performance monitoring of port statistics, refer to the *CellPath 300 ATM WAN Multiplexer Installation and Maintenance Manual*.

5.1 Overview of Port Configuration

Once modules are installed in the *CellPath* 300, each port to be used must be configured. Configuring a port involves setting a number of parameters that control that port's operation. Configure a port by making appropriate adjustments to the `Port Configuration` screen.

5.1.1 Accessing Configuration Screens

Figure 5.1 illustrates the steps necessary to access the various port configuration screens. Start with the *CellPath* 300 `System Configuration` screen, which appears when first logging into the *CellPath* 300. Move the cursor to the physical layer module containing the port to be configured and press the `<ENTER>` key.

If the module contains a single port, that port's configuration screen appears on the screen. If the module contains multiple ports, an intermediate screen appears. Within this intermediate screen, move the cursor to the specific port to be configured and press the `<ENTER>` key to bring up the port's configuration screen.

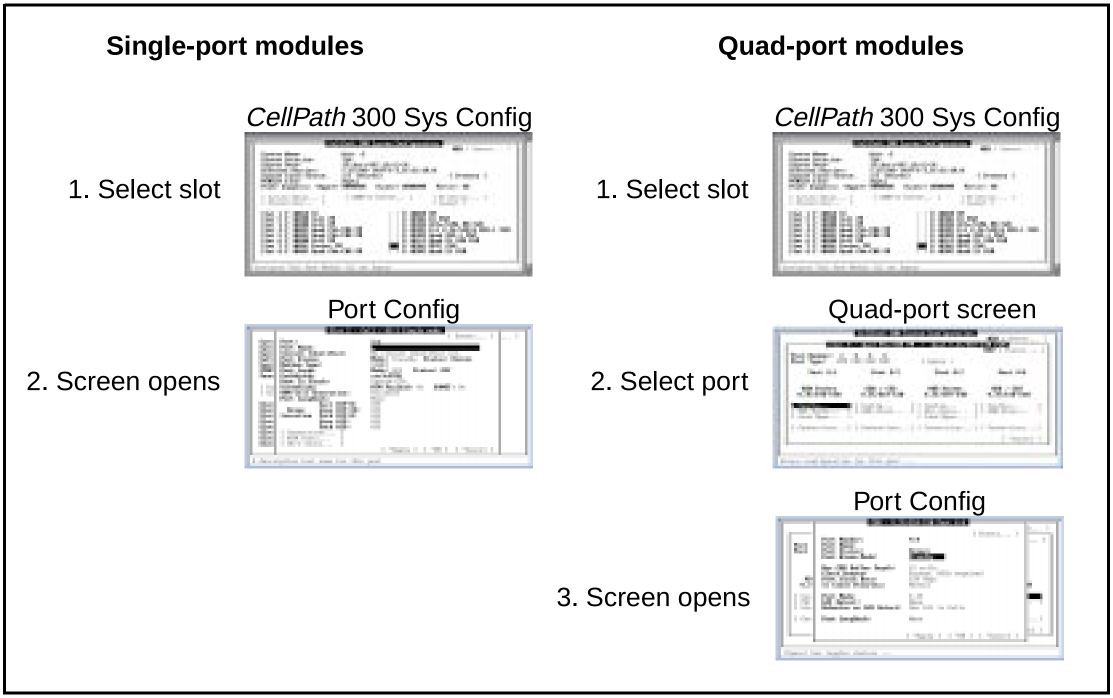


Figure 5.1 - Accessing a Port Configuration Screen

5.1.2 Changing Port Type on Packet/CBR Protocol Modules

Quad Packet/CBR protocol modules require the port type be set before assigning other settings. The module can be configured to run CBR traffic on all four ports, or a combination of two CBR and two packet (VBR) ports.

NOTE

The five physical layer modules that can be paired with the Quad Packet/CBR protocol module are Quad E1, Quad V.35/EIA-530, Quad DSX-1, Tri V.35/EIA-530 & DSX-1, and Tri V.35/EIA-530 & E1.

The first and third ports on a Quad V.35/EIA-530 module can be configured as packet (VBR) or CBR/CES as shown in Figure 5.2. Highlighting the `Port Type` field and pressing the space bar toggles through the available port type selections. Table 5.1 list the available port type options for the five physical layer modules.

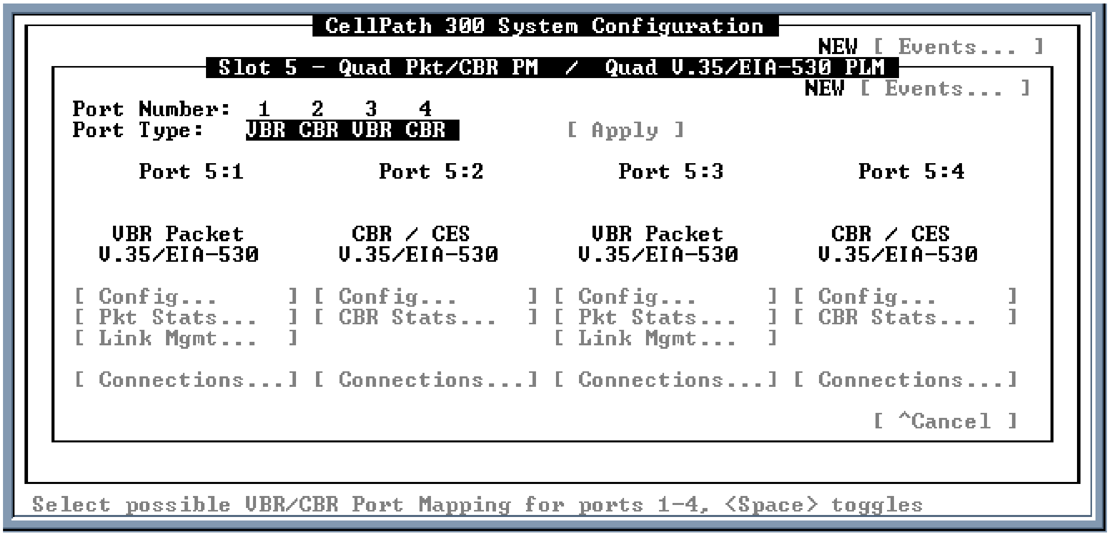


Figure 5.2 - Toggling Ports on a Quad V.35/EIA-530 Module

NOTE

Swapping the VBR/CBR status deletes all previously configured connections. It is best to decide whether the ports are to be configured as VBR or CBR before configuring connections.

Table 5.1 - Available Quad PM / PLM Port Type Options

Physical layer Module	Port Type Options			
	Port 1	**Port 2**	**Port 3**	**Port 4**
Quad DSX-1	VBR	CBR	VBR	CBR
	CBR	CBR	CBR	CBR
Tri V.35 / EIA-530 & DSX-1	VBR	CBR	VBR	CBR
	VBR	CBR	CBR	VBR
	CBR	CBR	CBR	CBR
Quad E1	VBR	CBR	VBR	CBR
	CBR	CBR	CBR	CBR
Tri V.35 / EIA-530 & E1	VBR	CBR	VBR	CBR
	VBR	CBR	CBR	VBR
	CBR	CBR	CBR	CBR
Quad V.35 / EIA-530	VBR	CBR	VBR	CBR
	CBR	CBR	CBR	CBR

5.1.3 Exiting Configuration Screens

The `[^Apply]` button applies any changes made in any configuration screen, without exiting the screen. The keyboard equivalent is `<Ctrl-A>`.

The `[^OK]` button applies any changes made in any configuration screen, then exits the screen. The keyboard equivalent is `<Ctrl-O>`.

The `[^Cancel]` button exits the screen without applying any changes made in any configuration screen. The keyboard equivalent is `<Ctrl-C>`.

5.2 Configuring a Cell/OC-3c/STM1 Single-Mode Port

The following pages describe how to configure a port that is transmitting or receiving cells over an OC-3c single-mode line. Fields that must be configured include `Port Name`, `Circuit Identifier`, `Port Alarm Mode`, `Medium Type`, `Port Laser Mode`, `Port Tx Clock`, `ATM Payload Scrambling`, and `SONET (or SDH) Line Scrambling`. Also ensure that the `Port Loopback` and `Error Insertion` parameters are set to `None`.

5.2.1 Accessing the Screen

Access the `Cell/OC-3 Single-mode Configuration` screen (Figure 5.3) from the *CellPath* 300 `System Configuration` screen by scrolling to a slot containing a cell/OC-3c pair and pressing the <ENTER> key.

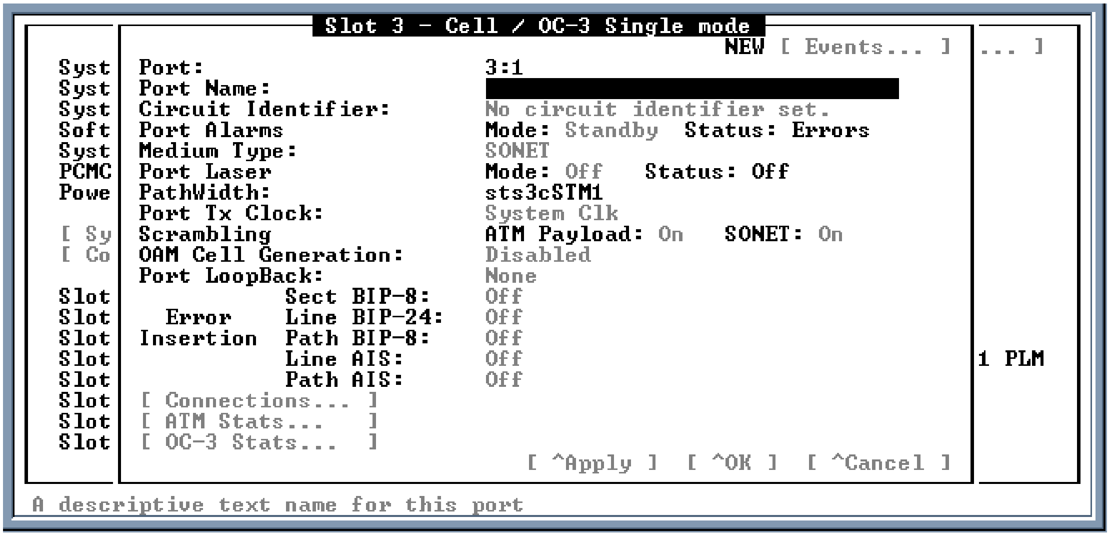


Figure 5.3 - Cell/OC-3c Single-mode Port Configuration Screen

5.2.2 Setting the Port Name

The `Port Name` parameter is a text string up to 31 characters long that can be used to identify the port.

5.2.3 Specifying a Circuit Identifier

The `Circuit Identifier` is a text string up to 255 characters long that uniquely identifies the circuit. This identifier is specified by the circuit vendor when setting up the circuit. The identifier should be recorded in this field, since it can be useful when communicating with the vendor during troubleshooting. Additional information such as a description of what the circuit is connected to can also appear in this field.

5.2.4 Setting the Port Alarm Mode

The `Port Alarm Mode` field allows turning alarm reporting on and off. During normal operation, alarm reporting should be on (`Active`), which logs each alarm into the `Event History Report` and can generate an SNMP trap. Turn alarm reporting off: (1) if the port is not in use; (2) during installation; or (3) when the port is expected to experience problems (i.e., during testing). The status of alarm reporting has no effect on data flowing through the port, or on connections terminating or originating at the port. The alarm reporting options are:

Active Turn on alarm reporting.

Standby Turn off alarm reporting (default).

Table 5.2 - Cell / OC-3c Single-Mode Port Alarm Mode

An Alarm at the Port	If Active	If Standby
Turns the IN and / or OUT port LEDs to red	Yes	Yes
Displays the word NEW next to the `Events` button at the top of every screen	Yes	No
Logs the alarm in the `Event History Report`	Yes	No
Generates an SNMP trap for the alarm (if traps are enabled)	Yes	No
Reported in the `Port Status` field on the configuration and statistics screens	Yes	Yes

5.2.5 Setting the Medium Type

The `Medium Type` field can take either of two values:

SONET OC-3c (default)

SDH STM1

5.2.6 Setting the Port Laser Mode

Port Laser Mode controls the operation of the laser transmitter for OC-3c single mode. Set this parameter to On in order for the port to work. For safety reasons, the factory default value is Off.

WARNING!

The OC-3c single-mode port is a Class 1 laser device. When the Port Laser Status indicator is on, do not look directly into the OC-3c output port or any attached optical fiber.

The Port Laser Mode options are:

On Turn on the OC-3c laser transmitter.

Off Turn off the OC-3c laser transmitter (default).

5.2.7 Specifying a Transmit Clock Source

Port Tx Clock specifies the source of the port's transmit clock.

When the transmit clock source is set to `System Clk`, the port uses the *CellPath* 300 system reference clock as its transmit clock. Use this setting when the *CellPath* 300 is to provide the timing reference for the network or terminal equipment attached to this port.

NOTE

For OC-3c ports, data is always received using a clock signal recovered from the incoming data; the *CellPath* 300 does not clock data asynchronously.

When the transmit clock source is set to `Loop Rx`, the *CellPath* 300 derives a clock signal from the port's receive channel data stream, and uses the derived signal as the port's transmit clock. Use this setting when the network or terminal equipment provides the timing for the *CellPath* 300. Use this option when the *CellPath* 300 timing source is not synchronized with the network or other equipment connected to this port. Port Tx Clock options are:

System Clk Use the system reference clock as the port's transmit clock (default).

Loop Rx Derive a clock signal from the port's receive channel data stream.

When a Cell/OC-3c port is used as the source for the system reference clock, this parameter should be set to `Loop Rx`.

5.2.8 Enabling/Disabling ATM Payload Scrambling

The ATM Payload Scrambling parameter enables or disables ATM cell payload scrambling, which removes long strings of 1s and 0s that could be mistaken as error conditions. Turn ATM payload scrambling on to connect the *CellPath* 300 to terminal equipment that has payload scrambling enabled. The ATM Payload Scrambling options are:

On Turn on ATM payload scrambling (default).

Off Turn off ATM payload scrambling.

5.2.9 Enabling/Disabling Line Scrambling

The Line Scrambling parameter enables or disables frame scrambling. Line scrambling removes any regular or periodic occurrence of a certain pattern from the payload (F6 28 hexadecimal) that could be erroneously interpreted as a frame boundary, in addition to removing long strings of 1s and 0s that could be mistaken as error conditions. The scrambling enabled by this parameter is distinct from that enabled by ATM payload scrambling. Line scrambling should always be on, except during testing.

This parameter appears on the configuration screen with either of two labels. When `Medium Type` is set to `SONET`, the line scrambling parameter is labeled “SONET”; when `Medium Type` is `SDH`, the line scrambling parameter is labeled “SDH.” The line scrambling options are:

On Turn on SONET/SDH scrambling (default).

Off Turn off SONET/SDH scrambling.

NOTE This port and the equipment attached to it must be set to the same scrambling settings.

5.2.10 OAM Cell Generation

This field allows or prevents internally-generated OAM cells, such as OAM fault management cells, which are generated at a PVC endpoint, from being sent out this cell port. They are passed out through this cell port towards other remote devices which have the capability to process them. Some ATM equipment cannot properly process the received OAM cells. Enable this option only if the endpoint devices have this capability.

Enable OAM Cell Generation if it is desired to allow these internally-generated OAM cells to be passed through this cell port. Disable OAM Cell Generation if it is desired to prevent OAM cells from being passed through this cell port. OAM Cell Generation options are:

Enabled Allows internally-generated OAM cells to be passed though this port.

Disabled Prevents internally-generated OAM cells from being passed through this port (default). When disabled, the OAM cells that would have passed out this port are simply not generated.

NOTE End-to-end OAM cells already on virtual connections are passed out this cell port.

5.2.11 Setting the Maximum Burst Size

If a device on the far end requires a fixed burst size, the maximum burst size can be set for this port. The options are

32 cells Sets the maximum burst size to 32 cells.

105 cells Sets the maximum burst size to 105 cells.

210 cells Sets the maximum burst size to 210 cells.

Maximum cells Sets the maximum burst size to the allowed maximum number of consecutive cells (default).

NOTE An updated 10200 Cell Protocol Module (Rev. 006 or higher) is required to gain access to the above option. To obtain an updated 10200 Cell PM, it is necessary to RMA the older the currently installed 10200 PM.

5.2.12 Using Loopbacks

The `Port Loopback` and the `Error Insertion` fields are used for testing only. To configure this port for normal operation, ensure that the `Port Loopback` field is set to `None`. Refer to the *CellPath 300 ATM WAN Installation and Maintenance Manual* for more information on the `Port Loopback` field.

5.2.13 Error Insertion

The Error Insertion functions are used for testing only. To configure this port for normal operation, ensure that the `Error Insertion` parameters are set to `Off`. Refer to *CellPath 300 Installation and Maintenance Manual* for more information on the `Error Insertion` fields.

5.2.14 Exiting the Screen

The `[^Apply]` button applies any changes made in this screen, without exiting the screen. The keyboard equivalent is `<Ctrl-A>`.

The `[^OK]` button applies any changes made in this screen, then exits the screen. The keyboard equivalent is `<Ctrl-O>`.

The `[^Cancel]` button exits the screen without applying any changes made in the screen. The keyboard equivalent is `<Ctrl-C>`.

5.3 Configuring a Cell/OC-3c/STM1 Multimode Port

The following pages describe how to configure a port that is transmitting or receiving cells over an OC-3c line. Fields that must be set to configure this port include `Port Name`, `Circuit Identifier`, `Port Alarm Mode`, `Medium Type`, `Port Tx Clock`, `ATM Payload Scrambling`, and `SONET/SDH Scrambling`. Ensure that the `Port Loopback` and `Error Insertion` parameters are set to `None`.

5.3.1 Accessing the Screen

The `Cell/OC-3 Multimode Configuration` screen (Figure 5.4) is accessed from the *CellPath* 300 `System Configuration` screen by scrolling to a slot containing a cell / OC-3c pair and pressing the <ENTER> key.

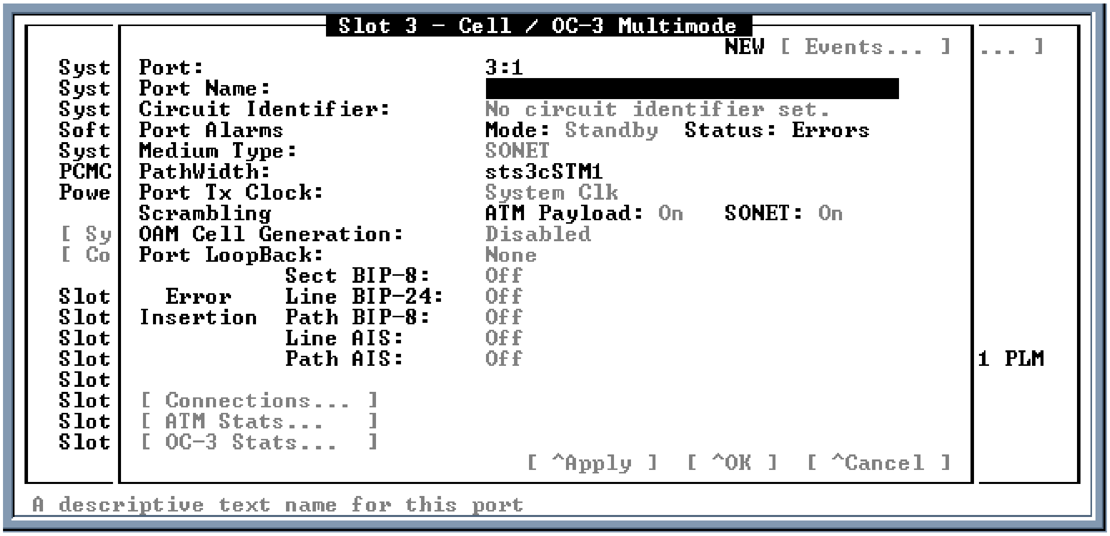


Figure 5.4 - Cell / OC-3c Multimode Port Configuration Screen

5.3.2 Setting the Port Name

The Port Name parameter is a text string up to 31 characters long that used to identify the port.

5.3.3 Specifying a Circuit Identifier

The `Circuit Identifier` parameter is a text string that uniquely identifies the circuit. This identifier is specified by the circuit vendor when setting up the circuit. The identifier should be recorded in this field, since it can be useful when communicating with the vendor during troubleshooting. Since the text string can be up to 255 characters long, additional information, such as a description of what the circuit is connected to, can also appear in this field.

5.3.4 Setting the Port Alarm Mode

The `Port Alarm Mode` field allows turning alarm reporting on and off. During normal operation, alarm reporting should be on `Active`, which logs each alarm into the `Event History Report` and can generate an SNMP trap. Turn alarm reporting off: (1) if the port is not in use; (2) during installation; or (3) when the port is expected to experience problems (i.e., during testing). The status of alarm reporting has no effect on data flowing through the port, or on connections terminating or originating at the port. The alarm reporting options are:

Active Turn on alarm reporting.

Standby Turn off alarm reporting (default).

Table 5.3 - Cell / OC-3c Multimode Port Alarm Mode

An Alarm at the Port	If Active	If Standby
Turns the IN and / or OUT port LEDs to red	Yes	Yes
Displays the word NEW next to the `Events` button at the top of every screen	Yes	No
Logs the alarm in the `Event History Report`	Yes	No
Generates an SNMP trap for the alarm (if traps are enabled)	Yes	No
Reported in the `Port Status` field on the configuration and statistics screens	Yes	Yes

5.3.5 Setting the Medium Type

The `Medium Type` field can take either of two values:

SONET OC-3c (default)

SDH STM1

5.3.6 Specifying a Transmit Clock Source

Port Tx Clock specifies the source of the port's transmit clock. When the transmit clock source is set to `System Clk`, the port uses the *CellPath* 300 system reference clock as its transmit clock. Use this setting when the *CellPath* 300 is to provide the timing reference for the network or terminal equipment attached to this port.

NOTE For OC-3c ports, data is always received using a clock signal recovered from the incoming data; the *CellPath* 300 does not clock data asynchronously.

When the transmit clock source is set to `Loop Rx`, the *CellPath* 300 derives a clock signal from the port's receive channel data stream, and uses the derived signal as the port's transmit clock. Use this setting when the network or terminal equipment provides the timing for the *CellPath* 300. Use this option when the *CellPath* 300 timing source is not synchronized with the network or other equipment connected to this port. The Port Tx Clock options are:

System Clk Use the *CellPath* 300 system reference clock as the port's transmit clock (default).

Loop Rx Derive a clock signal from the port's receive channel data stream.

When a cell/OC-3c port is used as the source for the system reference clock, this parameter should be set to `Loop Rx`.

5.3.7 Enabling/Disabling ATM Payload Scrambling

The ATM Payload Scrambling parameter enables or disables ATM cell payload scrambling, which removes long strings of 1s and 0s that could be mistaken as error conditions. Turn scrambling on to connect the *CellPath* 300 to terminal equipment that has scrambling enabled. The ATM Payload Scrambling options are:

On Turn on ATM payload scrambling (default).

Off Turn off ATM payload scrambling.

5.3.8 Enabling/Disabling Line Scrambling

The Line Scrambling parameter enables or disables line scrambling. Line scrambling removes any regular or periodic occurrence of a certain pattern from the payload (F6 28 hexadecimal) that could be erroneously interpreted as a frame boundary, in addition to removing long strings of 1s and 0s that could be mistaken as error conditions. The scrambling enabled by this parameter is distinct from that enabled by ATM payload scrambling. Line scrambling should always be on, except during testing.

This parameter appears on the configuration screen with either of two labels. When `Medium Type` is set to `SONET`, the line scrambling parameter is labeled "SONET;" when `Medium Type` is `SDH`, the line scrambling parameter is labeled "SDH." The line scrambling options are:

On Turn on SONET/SDH scrambling (default).

Off Turn off SONET/SDH scrambling.

NOTE This port and the equipment attached to it must be set to the same scrambling settings.

5.3.9 OAM Cell Generation

This filed allows or prevents internally-generated OAM cells, such as OAM fault management cells, which are generated at a PVC endpoint, from being sent out this cell port. They are passed out through this cell port towards other remote devices which have the capability to process them. Some ATM equipment cannot properly process the received OAM cells. Enable this option only if the endpoint devices have this capability.

Enable `OAM Cell Generation` if it is desired to allow these internally-generated OAM cells to be passed through this cell port. Disable `OAM Cell Generation` if it is desired to prevent OAM cells from being passed through this cell port.

`OAM Cell Generation` options are:

Enabled Allows internally-generated OAM cells to be passed though this port.

Disabled Prevents internally-generated OAM cells from being passed through this port (default). When disabled, the OAM cells that would have passed out this port are simply not generated.

NOTE End-to-end OAM cells already on virtual connections are passed out this cell port.

5.3.10 Setting the Maximum Burst Size

If a device on the far end requires a fixed burst size, the maximum burst size can be set for this port. The options are

32 cells	Sets the maximum burst size to 32 cells.
105 cells	Sets the maximum burst size to 105 cells.
210 cells	Sets the maximum burst size to 210 cells.
Maximum cells	Sets the maximum burst size to the allowed maximum number of consecutive cells (default).

5.3.11 Port Loopbacks

The `Port Loopback` and the `Error Insertion` fields are used for testing only. To configure this port for normal operation, make sure the `Port Loopback` field is set to `None`. Refer to *CellPath 300 ATM WAN Multiplexer Installation and Maintenance Manual* for more information on the `Port Loopback` field.

5.3.12 Error Insertion

The `Error Insertion` functions are used for testing only. To configure this port for normal operation, ensure that the `Error Insertion` parameters are set to `Off`. Refer to *CellPath 300 ATM WAN Installation and Maintenance Manual* for more information on the `Error Insertion` fields.

5.3.13 Exiting the Screen

The `[^Apply]` button applies any changes made in this screen, without exiting the screen. The keyboard equivalent is `<Ctrl-A>`.

The `[^OK]` button applies any changes made in this screen, then exits the screen. The keyboard equivalent is `<Ctrl-O>`.

The `[^Cancel]` button exits the screen without applying any changes made in the screen. The keyboard equivalent is `<Ctrl-C>`.

5.4 Configuring a Cell/DS3 Port

The following pages describe how to configure a port that is transmitting or receiving cells over a DS3 line. Fields that must be set to configure this port include `Port Name`, `Circuit Identifier`, `Port Alarm Mode`, `Port Protocol`, `ATM Payload Scrambling`, `Port Tx Clock`, `Framing Format`, and `Line Build Out`. Ensure that `Port Loopback` is set to `None`.

5.4.1 Accessing the Screen

The `Cell/DS3 Configuration` screen (Figure 5.5) is accessed from the *CellPath* 300 `System Configuration` screen by scrolling to a slot containing a cell / DS3 pair and pressing the `<ENTER>` key.

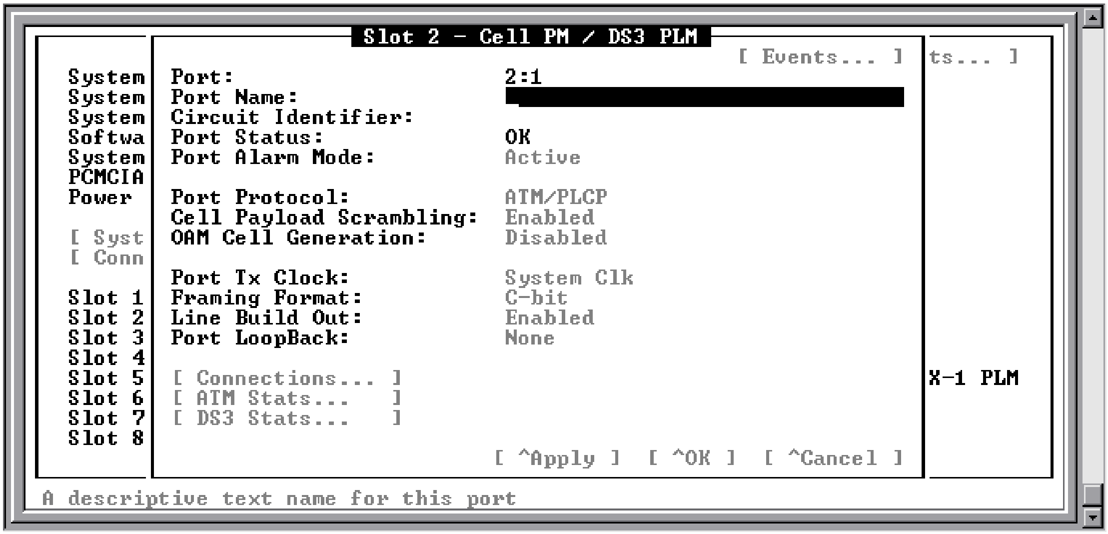


Figure 5.5 - Cell / DS3 Port Configuration Screen

5.4.2 Setting the Port Name

The `Port Name` parameter is a text string up to 31 characters long that is used to identify the port.

5.4.3 Specifying a Circuit Identifier

The `Circuit Identifier` parameter is a text string up to 255 characters long that uniquely identifies the circuit. This identifier is specified by the circuit vendor when setting up the circuit. The identifier should be recorded in this field, since it can be useful when communicating with the vendor during troubleshooting. Additional information such as a description of what the circuit is connected to can also appear in this field.

5.4.4 Setting the Port Alarm Mode

The `Port Alarm Mode` field allows turning alarm reporting on and off. During normal operation, alarm reporting should be on `Active`, which logs each alarm into the `Event History Report` and can generate an SNMP trap. Turn alarm reporting off: (1) if the port is not in use; (2) during installation; or (3) when the port is expected to experience problems (i.e., during testing). The status of alarm reporting has no effect on data flowing through the port, or on connections terminating or originating at the port. The alarm reporting options are:

Active Turn on alarm reporting.

Standby Turn off alarm reporting (default).

Table 5.4 - Cell / DS3 Port Alarm Mode

An Alarm at the Port	If Active	If Standby
Turns the IN and / or OUT port LEDs to red	Yes	Yes
Displays the word NEW next to the `Events` button at the top of every screen	Yes	No
Logs the alarm in the `Event History Report`	Yes	No
Generates an SNMP trap for the alarm (if traps are enabled)	Yes	No
Reported in the `Port Status` field on the configuration and statistics screens	Yes	Yes

5.4.5 Specifying Port Protocol and Cell Delineation

`Port Protocol` sets the port’s protocol and cell delineation method. This setting should match the one subscribed to for the particular network interface, or the one chosen for an attached piece of equipment.

Use the ATM / PLCP setting for a DS3 line subscribed to as an ATM User-to-Network Interface with PLCP ATM cell delineation. Use the ATM / HEC setting for a DS3 line subscribed to as an ATM User-to-Network Interface with ATM / HEC cell delineation. The Port Protocol options are:

ATM/PLCP	ATM UNI protocol, PLCP cell delineation
ATM/HEC	ATM UNI protocol, HEC cell delineation (default)

5.4.6 Enabling/Disabling Cell Payload Scrambling

The ATM Payload Scrambling parameter enables or disables ATM cell payload scrambling, which removes long strings of 1s and 0s that could be mistaken as error conditions. Enable scrambling to connect the *CellPath* 300 to terminal equipment that has scrambling enabled, or to connect the *CellPath* 300 to a DS3 network using older equipment susceptible to Blue Alarm conditions. The ATM Payload Scrambling options are:

Enabled	Turn on payload scrambling.
Disabled	Turn off payload scrambling (default).

5.4.7 OAM Cell Generation

This filed allows or prevents internally-generated OAM cells, such as OAM fault management cells, which are generated at a PVC endpoint, from being sent out this cell port. They are passed out through this cell port towards other remote devices which have the capability to process them. Some ATM equipment cannot properly process the received OAM cells. Enable this option only if the endpoint devices have this capability.

Enable OAM Cell Generation if it is desired to allow these internally-generated OAM cells to be passed through this cell port. Disable OAM Cell Generation if it is desired to prevent OAM cells from being passed through this cell port. OAM Cell Generation options are:

Enabled	Allows internally-generated OAM cells to be passed though this port.
Disabled	Prevents internally-generated OAM cells from being passed through this port (default). When disabled, the OAM cells that would have passed out this port are simply not generated.

NOTE

End-to-end OAM cells already on virtual connections are passed out this cell port.

5.4.8 Setting the Maximum Burst Size

If a device on the far end requires a fixed burst size, the maximum burst size can be set for this port. The options are

32 cells	Sets the maximum burst size to 32 cells.
105 cells	Sets the maximum burst size to 105 cells.
210 cells	Sets the maximum burst size to 210 cells.
Maximum cells	Sets the maximum burst size to the allowed maximum number of consecutive cells (default).

5.4.9 Specifying a Transmit Clock Source

Port Tx Clock specifies the source of the port's transmit clock. When the transmit clock source is set to `System Clk`, the port uses the *CellPath* 300 system reference clock as its transmit clock. Use this setting when the *CellPath* 300 is to provide the timing reference for the network or terminal equipment attached to this port.

NOTE

For DS3 ports, data is always received using a clock signal recovered from the incoming data; the *CellPath* 300 does not clock data asynchronously.

When the transmit clock source is set to `Loop Rx`, the *CellPath* 300 derives a clock signal from the port's receive channel data stream, and uses the derived signal as the port's transmit clock. Use this setting when the network or terminal equipment provides the timing for the *CellPath* 300. Use this option when the *CellPath* 300 timing source is not synchronized with the network or other equipment connected to this port. The Port Tx Clock options are:

System Clk	Use the *CellPath* 300 system reference clock as the port's transmit clock (default).
Loop Rx	Derive a clock signal from the port's receive channel data stream.

When a cell/DS3 port is used as the source for the system reference clock, this parameter should be set to `Loop Rx`.

5.4.10 Specifying a Framing Format

The `Framing Format` parameter sets the framing format for this port. Set the framing format to C-bit to connect the port to networks or terminal equipment supporting C-bit parity framing. Set the framing format to M23 when the network or terminal equipment to which the port is connected is not capable of being run in C-bit parity mode. The `Framing Format` options are:

C-bit Standard option for ATM.

M23 Use this option when the network or terminal equipment to which the port is connected is not capable of being run in C-bit parity mode.

5.4.11 Adjusting for Line Build Out

`Line Build Out` adjusts the DS3 signal level based on the amount of cable between the *CellPath* 300 and the nearest repeater or terminal equipment. The `Line Build Out` options are:

Enabled Use this setting when the port is attached to a short cable <60 m (<225 ft.) and experiencing bit-error-rate problems.

Disabled Normal setting (default).

5.4.12 Using Loopbacks

The `Port Loopback` is used for testing only. To configure this port for normal operation, ensure that the `Port Loopback` field is set to `None`. Refer to *CellPath 300 ATM WAN Multiplexer Installation and Maintenance Manual* for more information on the `Port Loopback` field.

5.4.13 Exiting the Screen

The `[^Apply]` button applies any changes made in this screen, without exiting the screen. The keyboard equivalent is `<Ctrl-A>`.

The `[^OK]` button applies any changes made in this screen, then exits the screen. The keyboard equivalent is `<Ctrl-O>`.

The `[^Cancel]` button exits the screen without applying any changes made in the screen. The keyboard equivalent is `<Ctrl-C>`.

5.5 Configuring a Cell/E3 Port

The following pages describe how to configure a port that is transmitting or receiving cells over an E3 line. Fields that must be set to configure this port include `Port Name`, `Circuit Identifier`, `Port Alarm Mode`, `Port Protocol`, `ATM Payload Scrambling`, `Port Tx Clock`, `Framing Format`, and `Line Build Out`. Ensure that `Port Loopback` is set to `None`.

5.5.1 Accessing the Screen

The `Cell/E3 Configuration` screen (Figure 5.6) is accessed from the *CellPath* 300 `System Configuration` screen by scrolling to a slot containing a Cell/E3 pair and pressing the <ENTER> key.

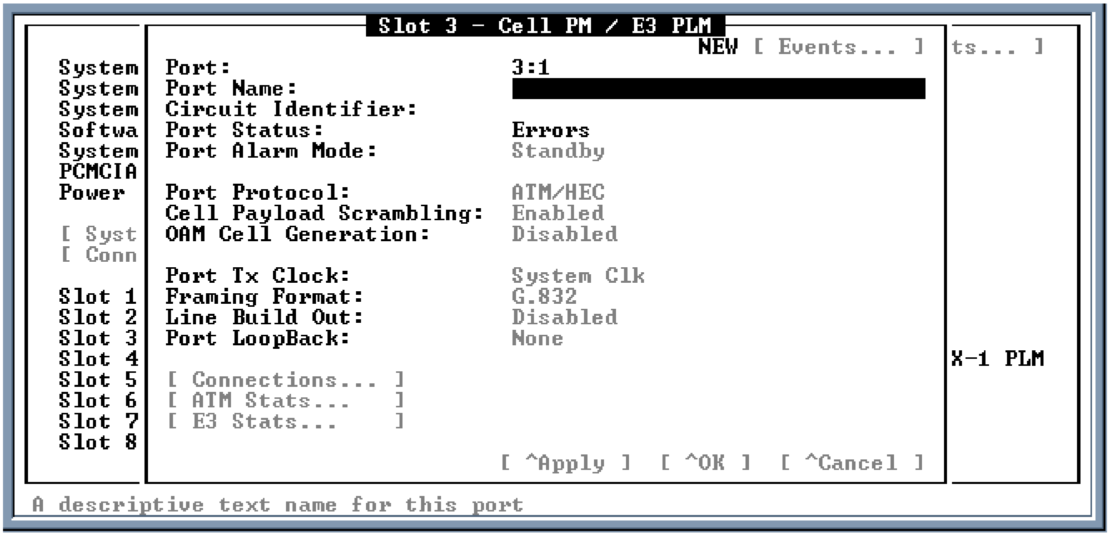


Figure 5.6 - Cell/E3 Port Configuration Screen

5.5.2 Setting the Port Name

The `Port Name` parameter is a text string up to 31 characters long that is used to identify the port.

5.5.3 Specifying a Circuit Identifier

The `Circuit Identifier` parameter is a text string up to 255 characters long that uniquely identifies the circuit. This identifier is specified by the circuit vendor when setting up the circuit. The identifier should be recorded in this field, since it can be useful when communicating with the vendor during troubleshooting. Additional information such as a description of what the circuit is connected to can also appear in this field.

5.5.4 Setting the Port Alarm Mode

The `Port Alarm Mode` field allows turning alarm reporting on and off. During normal operation, alarm reporting should be on `Active`, which logs each alarm into the `Event History Report` and can generate an SNMP trap. Turn alarm reporting off: (1) if the port is not in use; (2) during installation; or (3) when the port is expected to experience problems (i.e., during testing). The status of alarm reporting has no effect on data flowing through the port, or on connections terminating or originating at the port. The alarm reporting options are:

Active Turn on alarm reporting.

Standby Turn off alarm reporting (default).

Table 5.5 - Cell/E3 Port Alarm Mode

An Alarm at the Port	If Active	If Standby
Turns the IN and/or OUT port LEDs to red	Yes	Yes
Displays the word NEW next to the `Events` button at the top of every screen	Yes	No
Logs the alarm in the `Event History Report`	Yes	No
Generates an SNMP trap for the alarm (if traps are enabled)	Yes	No
Reported in the `Port Status` field on the configuration and statistics screens	Yes	Yes

5.5.5 Specifying Port Protocol and Cell Delineation

Port Protocol sets the port's protocol and cell delineation method. This setting should match the one subscribed to for the particular network interface, or the one chosen for an attached piece of equipment.

Use the ATM / HEC setting for an E3 line subscribed to as an ATM User-to-Network Interface with ATM / HEC cell delineation. The Port Protocol option is as follows:

ATM/HEC	ATM UNI protocol, HEC cell delineation (default)
SMDS/PLCP	Not supported in this release of the *CellPath* 300
SMDS/PLCP/NoMux	Not supported in this release of the *CellPath* 300

5.5.6 Enabling/Disabling Cell Payload Scrambling

The `Cell Payload Scrambling` parameter enables or disables ATM cell payload scrambling, which removes long strings of 1s and 0s that could be mistaken as error conditions. Turn scrambling on to connect the *CellPath* 300 to terminal equipment or an E3 network that has scrambling enabled. The Cell Payload Scrambling options are:

Enabled	Turn on payload scrambling (default).
Disabled	Turn off payload scrambling.

5.5.7 OAM Cell Generation

This field allows or prevents internally-generated OAM cells, such as OAM fault management cells, which are generated at a PVC endpoint, from being sent out this cell port. They are passed out through this cell port towards other remote devices which have the capability to process them. Some ATM equipment cannot properly process the received OAM cells. Enable this option only if the endpoint devices have this capability.

Enable OAM Cell Generation if it is desired to allow these internally-generated OAM cells to be passed through this cell port. Disable OAM Cell Generation if it is desired to prevent OAM cells from being passed through this cell port. OAM Cell Generation options are:

Enabled	Allows internally-generated OAM cells to be passed though this port.
Disabled	Prevents internally-generated OAM cells from being passed through this port (default). When disabled, the OAM cells that would have passed out this port are simply not generated.

NOTE

End-to-end OAM cells already on virtual connections are passed out this cell port.

5.5.8 Setting the Maximum Burst Size

If a device on the far end requires a fixed burst size, the maximum burst size can be set for this port. The options are

32 cells Sets the maximum burst size to 32 cells.

105 cells Sets the maximum burst size to 105 cells.

210 cells Sets the maximum burst size to 210 cells.

Maximum cells Sets the maximum burst size to the allowed maximum number of consecutive cells (default).

5.5.9 Specifying a Transmit Clock Source

Port Tx Clock specifies the source of the port's transmit clock.

When the transmit clock source is set to `System Clk`, the port uses the *CellPath* 300 system reference clock as its transmit clock. Use this setting when the *CellPath* 300 is to provide the timing reference for the network or terminal equipment attached to this port.

NOTE

For E3 ports, data is always received using a clock signal recovered from the incoming data; the *CellPath* 300 does not clock data asynchronously.

When the transmit clock source is set to `Loop Rx`, the *CellPath* 300 derives a clock signal from the port's receive channel data stream, and uses the derived signal as the port's transmit clock. Use this setting when the network or terminal equipment provides the timing for the *CellPath* 300. Use this option when the *CellPath* 300 timing source is not synchronized with the network or other equipment connected to this port. The Port Tx Clock options are:

System Clk Use the *CellPath* 300 system reference clock as the port's transmit clock (default).

Loop Rx Derive a clock signal from the port's receive channel data stream.

When a cell/E3 port is used as the source for the system reference clock, this parameter should be set to `Loop Rx`.

5.5.10 Setting the Framing Format

Set the E3 framing format to match that of the signal being received on this port. The `Framing Format` options are:

G.832 Use this option with G.832 E3 interfaces (default).

G.751 Not supported in this release of the *CellPath* 300.

5.5.11 Adjusting for Line Build Out

`Line Build Out` adjusts the E3 signal level based on the amount of cable between the *CellPath* 300 and the nearest repeater or terminal equipment. The `Line Build Out` options are:

Enabled Use this setting when the port is attached to a short cable <60 m (<225 ft.) and experiencing bit-error-rate problems.

Disabled Normal setting (default).

5.5.12 Using Loopbacks

The `Port Loopback` field is used for testing only. To configure this port for normal operation, ensure that the `Port Loopback` field is set to `None`. Refer to *CellPath 300 ATM WAN Multiplexer Installation and Maintenance Manual* for more information on the `Port Loopback` field.

5.5.13 Exiting the Screen

The `[^Apply]` button applies any changes made in this screen, without exiting the screen. The keyboard equivalent is `<Ctrl-A>`.

The `[^OK]` button applies any changes made in this screen, then exits the screen. The keyboard equivalent is `<Ctrl-O>`.

The `[^Cancel]` button exits the screen without applying any changes made in the screen. The keyboard equivalent is `<Ctrl-C>`.

5.6 Configuring a Cell/J2 Port

The following pages tell how to configure a port that is transmitting or receiving cells over a J2 line. Fields that must be set to configure this port include `Port Name`, `Circuit Identifier`, `Port Alarm Mode`, `Port Protocol`, `Cell Payload Scrambling`, `OAM Cell Generation`, `Port Tx Clock`, `Framing Format`, and `Receive Equalization`.

5.6.1 Accessing the Screen

The `Cell/J2 Configuration` screen (Figure 5.7) is accessed from the *CellPath* 300 `System Configuration` screen by scrolling to a slot containing a Cell/J2 pair and pressing the `<ENTER>` key.

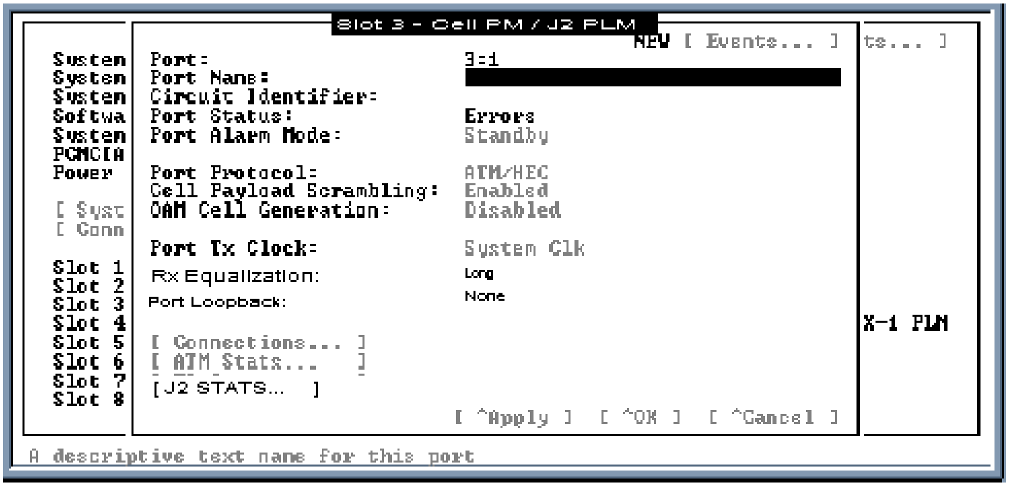


Figure 5.7 - Cell/J2 Port Configuration Screen

5.6.2 Setting the Port Name

The `Port Name` parameter is a text string up to 31 characters long used to identify the port.

5.6.3 Specifying a Circuit Identifier

The `Circuit Identifier` parameter is a text string up to 255 characters long that uniquely identifies the circuit. This identifier is specified by the circuit vendor when setting up the circuit. The identifier should be recorded in this field, since it can be useful when communicating with the vendor during troubleshooting. Additional information such as a description of what the circuit is connected to can also appear in this field.

5.6.4 Setting the Port Alarm Mode

The `Port Alarm Mode` field allows turning alarm reporting on and off. During normal operation, alarm reporting should be on (Active), which logs each alarm into the `Event History Report` and can generate an SNMP trap. Turn alarm reporting off: (1) if the port is not in use; (2) during installation; or (3) when the port is expected to experience problems (i.e., during testing). The status of alarm reporting has no effect on data flowing through the port, or on connections terminating or originating at the port. The alarm reporting options are:

Active Turn on alarm reporting.

Standby Turn off alarm reporting (default).

Table 5.6 - Cell/J2 Port Alarm Mode

An Alarm at the Port	If Active	If Standby
Turns the IN and/or OUT port LEDs to red	Yes	Yes
Displays the word NEW next to the `Events` button at the top of every screen	Yes	No
Logs the alarm in the `Event History Report`	Yes	No
Generates an SNMP trap for the alarm (if traps are enabled)	Yes	No
Reported in the `Port Status` field on the configuration and statistics screens	Yes	Yes

5.6.5 Port Protocol and Cell Delineation

The port protocol and cell delineation method for a Cell/J2 module is a J2 line subscribed to as an ATM User-to-Network Interface with ATM/HEC cell delineation. There is only one value for this parameter so it is not user-selectable.

5.6.6 Enabling/Disabling Cell Payload Scrambling

The Cell Payload Scrambling parameter enables or disables ATM cell payload scrambling, which removes long strings of 1s and 0s that could be mistaken as error conditions by some types of transmission equipment. Enable scrambling to connect the *CellPath* 300 to terminal equipment or a J2 network that has scrambling enabled. The Cell Payload Scrambling options are:

Enable Enable payload scrambling.

Disable Disable payload scrambling (default).

5.6.7 OAM Cell Generation

This field is used to allow or prevent internally-generated OAM cells, such as OAM fault management cells, which were generated at a PVC endpoint, from being sent out this cell port. They are passed out through this cell port towards other remote devices which have the capability to process them. Some ATM equipment cannot properly process the received OAM cells. This option should only be enabled if the endpoint devices have this capability.

Enable OAM Cell Generation if these internally-generated OAM cells are to be passed through this cell port. Disable OAM Cell Generation to prevent OAM cells from being passed through the cell port. The OAM Cell Generation options are:

Enabled Allows internally-generated OAM cells to be passed through this port.

Disabled Prevents internally-generated OAM cells from being passed through this port (default). When disabled, the OAM cells that would have passed out this cell port are simply not generated.

NOTE End-to-end OAM cells already on virtual channel connections are passed out this cell port.

5.6.8 Setting the Maximum Burst Size

If a device on the far end requires a fixed burst size, the maximum burst size can be set for this port. The options are

32 cells Sets the maximum burst size to 32 cells.

105 cells Sets the maximum burst size to 105 cells.

210 cells Sets the maximum burst size to 210 cells.

Maximum cells Sets the maximum burst size to the allowed maximum number of consecutive cells (default).

5.6.9 Specifying a Transmit Clock Source

Port Tx Clock specifies the source of the port's transmit clock.

When the transmit clock source is set to `System Clk`, the port uses the *CellPath* 300 system reference clock as its transmit clock. Use this setting when the *CellPath* 300 is to provide the timing reference for the network or terminal equipment attached to this port.

NOTE

For J2 ports, data is always received using a clock signal recovered from the incoming data; the *CellPath* 300 does not clock data asynchronously.

When the transmit clock source is set to `Loop Rx`, the *CellPath* 300 derives a clock signal from the port's receive channel data stream, and uses the derived signal as the port's transmit clock. Use this option when the *CellPath* 300 timing source is not synchronized with the network or other equipment connected to this port. The Port Tx Clock options are:

System Clk Use the *CellPath* 300 system reference clock as the port's transmit clock (default).

Loop Rx Derive a clock signal from the port's receive channel data stream.

5.6.10 Adjusting for Receive Equalization

The receive equalization setting adjusts the J2 signal level based on the amount of cable between the *CellPath* 300 and the nearest repeater or terminal equipment. The Rx Equalization options are:

Short Normal setting (default).

Long Use this setting when the port is attached to a long cable (>120 M) and is experiencing bit-error-rate problems.

5.6.11 Using Loopbacks

`Port Loopback` is used for testing only. To configure this port for normal operation, ensure that this field is set to `None`. Refer to *CellPath 300 ATM WAN Installation and Maintenance Manual* for more information about the `Port Loopback` field.

5.6.12 Exiting the Screen

The `[^Apply]` button applies any changes made in the screen, without exiting the screen. The keyboard equivalent is `<Ctrl-A>`.

The `[^OK]` button applies any changes made in the screen, then exits the screen. The keyboard equivalent is `<Ctrl-O>`.

The `[^Cancel]` button exits the screen without applying any changes made in the screen. The keyboard equivalent is `<Ctrl-C>`.

5.7 Configuring a Cell/DSX-1 Port

The following pages describe how to configure a port that is transmitting or receiving cells over a DSX-1 line. Fields that must be set to configure this port include `Port Name`, `Circuit Identifier`, `Port Alarm Mode`, `Port Protocol`, `ATM Payload Scrambling`, `Port Tx Clock`, `Framing Format`, and `Line Coding`. Ensure that `Port Loopback` is set to `None`.

5.7.1 Accessing the Screen

The `Cell/DSX-1 Configuration` screen (Figure 5.8) is accessed from the port selection screen for a multiport module.

To access the port selection screen from the *CellPath* 300 `System Configuration` screen, scroll to a slot containing a multiport module (quad DSX-1 attached to a cell protocol module) and press the `<ENTER>` key. Within the port selection screen, scroll to the port to be configured and press the `<ENTER>` key.

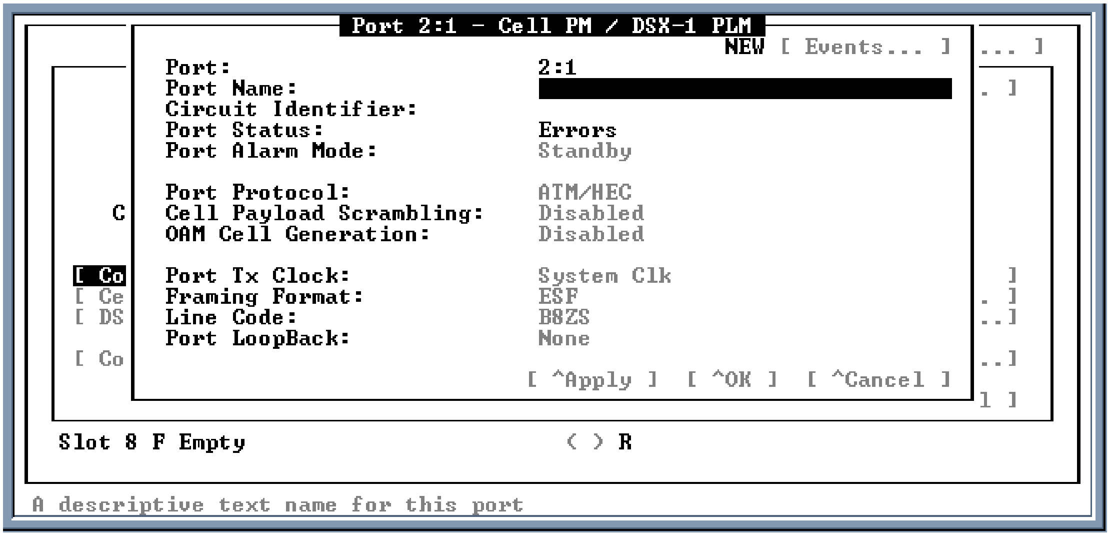


Figure 5.8 - Cell / DSX-1 Port Configuration Screen

5.7.2 Setting the Port Name

The Port Name parameter is a text string up to 31 characters long that is used to identify the port.

5.7.3 Specifying a Circuit Identifier

The `Circuit Identifier` parameter is a text string up to 255 characters long that uniquely identifies the circuit. This identifier is specified by the circuit vendor when setting up the circuit. The identifier should be recorded in this field, since it can be useful when communicating with the vendor during troubleshooting. Additional information such as a description of what the circuit is connected to can also appear in this field.

5.7.4 Setting the Port Alarm Mode

The `Port Alarm Mode` field allows turning alarm reporting on and off. During normal operation, alarm reporting should be on `Active`, which logs each alarm into the `Event History Report` and can generate an SNMP trap. Turn alarm reporting off: (1) if the port is not in use; (2) during installation; or (3) when the port is expected to experience problems (i.e., during testing). The status of alarm reporting has no effect on data flowing through the port, or on connections terminating or originating at the port. The alarm reporting options are:

Active Turn on alarm reporting.

Standby Turn off alarm reporting (default).

Table 5.7 - Cell / DSX-1 Port Alarm Mode

An Alarm at the Port	If Active	If Standby
Turns the IN and / or OUT port LEDs to red	Yes	Yes
Displays the word NEW next to the `Events` button at the top of every screen	Yes	No
Logs the alarm in the `Event History Report`	Yes	No
Generates an SNMP trap for the alarm (if traps are enabled)	Yes	No
Reported in the `Port Status` field on the configuration and statistics screens	Yes	Yes

5.7.5 Specifying Port Protocol and Cell Delineation

Port Protocol sets the port's protocol and cell delineation method. This setting should match the one subscribed to for the particular network interface.

Use the ATM / PLCP setting for a DSX-1 line subscribed to as an ATM User-to-Network Interface with PLCP ATM cell delineation.

Use the ATM / HEC setting for a DSX-1 line subscribed to as an ATM User-to-Network Interface with ATM / HEC cell delineation. The Port Protocol options are:

ATM/PLCP	ATM UNI protocol, PLCP cell delineation
ATM/HEC	ATM UNI protocol, HEC cell delineation (default)
SMDS/PLCP	Not supported in this release of the *CellPath* 300
SMDS/PLCP/NoMux	Not supported in this release of the *CellPath* 300

5.7.6 Enabling/Disabling Cell Payload Scrambling

The `ATM Payload Scrambling` parameter enables or disables ATM cell payload scrambling, which removes long strings of 1s and 0s that could be mistaken as error conditions. Turn scrambling on to connect the *CellPath* 300 to terminal equipment that has scrambling enabled. The ATM Payload Scrambling options are:

On	Turn on payload scrambling.
Off	Turn off payload scrambling (default).

5.7.7 OAM Cell Generation

This field is used to allow or prevent internally-generated OAM cells, such as OAM fault management cells, which were generated at a PVC endpoint, from being sent out this cell port. They are passed out through this cell port towards other remote devices which have the capability to process them. Some ATM equipment cannot properly process the received OAM cells. This option should only be enabled if the endpoint devices have this capability.

Enable OAM Cell Generation if these internally-generated OAM cells are to be passed through this cell port. Disable OAM Cell Generation to prevent OAM cells from being passed through the cell port. The OAM Cell Generation options are:

Enabled	Allows internally-generated OAM cells to be passed through this port.
Disabled	Prevents internally-generated OAM cells from being passed through this port (default). When disabled, the OAM cells that would have passed out this cell port are simply not generated.

NOTE

End-to-end OAM cells already on virtual channel connections are passed out this cell port.

5.7.8 Specifying a Transmit Clock Source

Port Tx Clock specifies the source of the port's transmit clock.

When the transmit clock source is set to `System Clk`, the port uses the *CellPath* 300 system reference clock as its transmit clock. Use this setting when the *CellPath* 300 is to provide the timing reference for the network or terminal equipment attached to this port.

NOTE

For DSX-1 ports, data is always received using a clock signal recovered from the incoming data; the *CellPath* 300 does not clock data asynchronously.

When the transmit clock source is set to `Loop Rx`, the *CellPath* 300 derives a clock signal from the port's receive channel data stream, and uses the derived signal as the port's transmit clock. Use this setting when the network or terminal equipment provides the timing for the *CellPath* 300. Use this option when the *CellPath* 300 timing source is not synchronized with the network or other equipment connected to this port. The Port Tx Clock options are:

System Clk Use *CellPath* 300 system reference clock as port transmit clock (default).

Loop Rx Derive a clock signal from the port's receive channel data stream.

When a Cell/DSX-1 port is used as the source for the system reference clock, this parameter should be set to Loop Rx.

5.7.9 Selecting a Framing Format

Use the `Framing Format` field to specify the DSX-1 framing format used by the port. The port must be set to recognize and transmit data using the same framing format as the network or device to which it is connected. The Framing format options are:

ESF Extended Super Frame (default)

SF (D4) Super Frame (D4)

5.7.10 Setting the Line Code

Set the DSX-1 line coding to match the line coding of the network or terminal equipment attached to this port. The Line Coding options are:

B8ZS	Binary 8 Zeroes Substitution (default)
AMI	Alternate Mark Inversion

5.7.11 Using Loopbacks

`Port Loopback` is used for testing only. To configure this port for normal operation, make sure this field is set to `None`. Refer to *CellPath 300 ATM WAN Multiplexer Installation and Maintenance Manual* for more information about the `Port Loopback` field.

5.7.12 Exiting the Screen

The `[^Apply]` button applies any changes made in the screen, without exiting the screen. The keyboard equivalent is `<Ctrl-A>`.

The `[^OK]` button applies any changes made in the screen, then exits the screen. The keyboard equivalent is `<Ctrl-O>`.

The `[^Cancel]` button exits the screen without applying any changes made in the screen. The keyboard equivalent is `<Ctrl-C>`.

5.8 Configuring a Cell/E1 Port

The following pages describe how to configure a port that is transmitting or receiving cells over an E1 line. Fields that must be set to configure this port include `Port Name`, `Circuit Identifier`, `Port Alarm Mode`, `Port Protocol`, `ATM Payload Scrambling`, `Port Tx Clock`, `Framing Format`, and `CRC4 Error Checking`. Ensure that `Port Loopback` is set to `None`.

5.8.1 Accessing the Screen

The `Cell/E1 Port Configuration` screen (Figure 5.9) is accessed from the port selection screen for a multiport module.

To access the port selection screen from the *CellPath* 300 `System Configuration` screen, scroll to a slot containing a multiport module (quad E1 attached to a cell protocol module) and press the <ENTER> key. Within the port selection screen, scroll to the port to be configured and press the <ENTER> key.

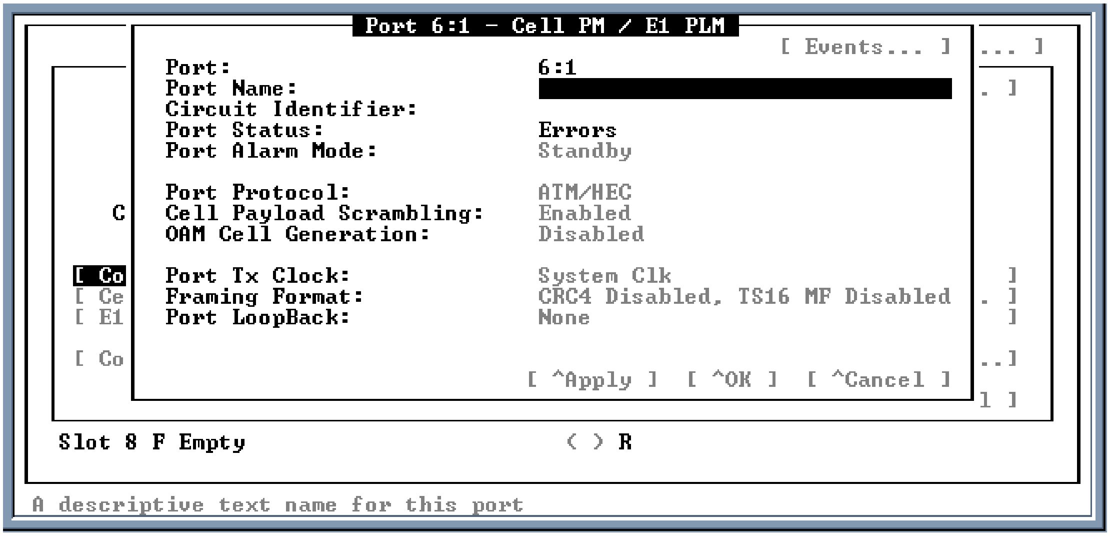


Figure 5.9 - Cell / E1 Port Configuration Screen

5.8.2 Setting the Port Name

The Port Name parameter is a text string up to 31 characters long that is used to identify the port.

5.8.3 Specifying a Circuit Identifier

The Circuit Identifier parameter is a text string up to 255 characters long that uniquely identifies the circuit. This identifier is specified by the circuit vendor when setting up the circuit. The identifier should be recorded in this field, since it can be useful when communicating with the vendor during troubleshooting. Additional information such as a description of what the circuit is connected to can also appear in this field.

5.8.4 Setting the Port Alarm Mode

The Port Alarm Mode field allows turning alarm reporting on and off. During normal operation, alarm reporting should be on Active, which logs each alarm into the Event History Report and can generate an SNMP trap. Turn alarm reporting off: (1) if the port is not in use; (2) during installation; or (3) when the port is expected to experience problems (i.e., during testing). The status of alarm reporting has no effect on data flowing through the port, or on connections terminating or originating at the port. The alarm reporting options are:

Active Turn on alarm reporting.

Standby Turn off alarm reporting (default).

Table 5.8 - Cell/E1 Port Alarm Mode

An Alarm at the Port	If Active	If Standby
Turns the IN and/or OUT port LEDs to red	Yes	Yes
Displays the word NEW next to the Events button at the top of every screen	Yes	No
Logs the alarm in the Event History Report	Yes	No
Generates an SNMP trap for the alarm (if traps are enabled)	Yes	No
Reported in the Port Status field on the configuration and statistics screens	Yes	Yes

5.8.5 Specifying Port Protocol and Cell Delineation

Port Protocol sets the port's protocol and cell delineation method. This setting should match the one subscribed to for the particular network interface.

Use the ATM / HEC setting for an E1 line subscribed to as an ATM User-to-Network Interface with HEC ATM cell delineation. The Port Protocol option is as follows:

ATM/HEC ATM UNI protocol, HEC cell delineation (default)

SMDS/PLCP Not supported in this release of the *CellPath* 300

SMDS/PLCP/NoMux Not supported in this release of the *CellPath* 300

5.8.6 Enabling/Disabling Cell Payload Scrambling

The `ATM Payload Scrambling` parameter enables or disables ATM cell payload scrambling, which removes long strings of 1s and 0s that could be mistaken as error conditions. Turn scrambling on to connect the *CellPath* 300 to terminal equipment that has scrambling enabled. The ATM Payload Scrambling options are:

On Turn on payload scrambling (default).

Off Turn off payload scrambling.

5.8.7 OAM Cell Generation

This field is used to allow or prevent internally-generated OAM cells, such as OAM fault management cells, which were generated at a PVC endpoint, from being sent out this cell port. They are passed out through this cell port towards other remote devices which have the capability to process them. Some ATM equipment cannot properly process the received OAM cells. This option should only be enabled if the endpoint devices have this capability.

Enable OAM Cell Generation if these internally-generated OAM cells are to be passed through this cell port. Disable OAM Cell Generation to prevent OAM cells from being passed through the cell port. The OAM Cell Generation options are:

Enabled Allows internally-generated OAM cells to be passed through this port.

Disabled Prevents internally-generated OAM cells from being passed through this port (default). When disabled, the OAM cells that would have passed out this cell port are simply not generated.

NOTE End-to-end OAM cells already on virtual channel connections are passed out this cell port.

5.8.8 Specifying a Transmit Clock Source

Port Tx Clock specifies the source of the port's transmit clock.

When the transmit clock source is set to `System Clk`, the port uses the *CellPath* 300 system reference clock as its transmit clock. Use this setting when the *CellPath* 300 is to provide the timing reference for the network or terminal equipment attached to this port.

NOTE

For E1 ports, data is always received using a clock signal recovered from the incoming data; the *CellPath* 300 does not clock data asynchronously.

When the transmit clock source is set to `Loop Rx`, the *CellPath* 300 derives a clock signal from the port's receive channel data stream, and uses the derived signal as the port's transmit clock. Use this setting when the network or terminal equipment provides the timing for the *CellPath* 300. Use this option when the *CellPath* 300 timing source is not synchronized with the network or other equipment connected to this port. The Port Tx Clock options are:

System Clk Use the *CellPath* 300 system reference clock as the port's transmit clock (default).

Loop Rx Derive a clock signal from the port's receive channel data stream.

When a cell/E1 port is used as the source for the system reference clock, this parameter should be set to `Loop Rx`.

5.8.9 Framing Format

This field provides selection for CRC4 Error Checking and Time Slot 16 Multiframing. Toggle through the four available selections by pressing the `[Space Bar]`.

CRC4 Error Checking specifies whether or not the E1 port performs a CRC4 error check on all data received. Time Slot 16 Multiframe controls whether or not time slot 16 is reserved for signalling information. Set this option to match the network or terminal equipment connected to this port, or framing errors result. The available options are:

CRC4 Disabled, TS16 Multiframe Disabled Disable CRC4 error checking; use time slot 16 as another data channel (default).

CRC4 Enabled, TS16 Multiframe Disabled Enable CRC4 error checking; use time slot 16 as another data channel.

CRC4 Disabled, TS16 Multiframe Enabled Disable CRC4 error checking; reserve time slot 16 for signalling information.

CRC4 Enabled, TS16 Multiframe Enabled — Enable CRC4 error checking; reserve time slot 16 for signalling information.

5.8.10 Using Loopbacks

`Port Loopback` is used for testing only. To configure this port for normal operation, make sure this field is set to `None`. Refer to the *CellPath 300 ATM WAN Installation and Maintenance Manual* for more information about the `Port Loopback` field.

5.8.11 Exiting the Screen

The `[^Apply]` button applies any changes made in the screen, without exiting the screen. The keyboard equivalent is `<Ctrl-A>`.

The `[^OK]` button applies any changes made in the screen, then exits the screen. The keyboard equivalent is `<Ctrl-O>`.

The `[^Cancel]` button exits the screen without applying any changes made in the screen. The keyboard equivalent is `<Ctrl-C>`.

5.9 Setting Up a Cell/IMA DS1 Group

The following pages describe the steps to setup a port that is transmitting or receiving Inverse Multiplex over ATM (IMA) Cells over a DS1 line. Fields that must be set to configure this port include `Port Name`, `Circuit Identifier`, `Port Alarm Mode`, `Port Protocol`, `ATM Payload Scrambling`, `Port Tx Clock`, `Framing Format`, and `Line Coding`. Ensure that `Port Loopback` is set to `None`.

5.9.1 Accessing the Screen

The `Cell/IMA DS1 PLM Setup` screen (Figure 5.10) is accessed from the port selection screen for a Quad IMA DS1 PLM supported by a Cell PM.

To access the IMA DS1 Group Setup screen from the *CellPath* 300 `System Configuration` screen, scroll to a slot containing a multiport module (IMA DS1 PLM attached to a Cell PM) and press the <ENTER> key. Within the port selection screen, scroll to the port to be configured and press the <ENTER> key.

Figure 5.10 - Cell/IMA DS1 PLM Setup Screen

5.9.2 Specifying a Circuit Identifier

The `Circuit Identifier` parameter is a text string up to 255 characters long that uniquely identifies the circuit. This identifier is specified by the circuit vendor when setting up the circuit. The identifier should be recorded in this field, since it can be useful when communicating with the vendor during troubleshooting. Additional information such as a description of what the circuit is connected to can also appear in this field.

5.9.3 Setting the Number of Redundant Links

This option specifies the number of links the system can lose from this group while retaining sufficient bandwidth for the application. The options are `0, 1, 2, 3,` or `4` redundant links. The default is `4`.

5.9.4 Setting the Port Alarm Mode

The `Port Alarm Mode` field allows turning alarm reporting on and off. During normal operation, alarm reporting should be on `Active`, which logs each alarm into the `Event History Report` and can generate an SNMP trap. Turn alarm reporting off: (1) if the port is not in use; (2) during installation; or (3) when the port is expected to experience problems (i.e., during testing). The status of alarm reporting has no effect on data flowing through the port, or on connections terminating or originating at the port. The alarm reporting options are:

Active Turn on alarm reporting.

Standby Turn off alarm reporting (default).

Table 5.9 - Cell/IMA DS-1 Group Alarm Mode

An Alarm at the Port	If Active	If Standby
Turns the IN and/or OUT port LEDs to red	Yes	Yes
Displays the word NEW next to the `Events` button at the top of every screen	Yes	No
Logs the alarm in the `Event History Report`	Yes	No
Generates an SNMP trap for the alarm (if traps are enabled)	Yes	No
Reported in the `Port Status` field on the configuration and statistics screens	Yes	Yes

5.9.5 Enabling/Disabling Payload Scrambling

The ATM Payload Scrambling parameter enables or disables ATM cell payload scrambling, which removes long strings of 1s and 0s that could be mistaken as error conditions. Turn scrambling on to connect the *CellPath* 300 to terminal equipment that has scrambling enabled. The ATM Payload Scrambling options are:

On Turn on payload scrambling.

Off Turn off payload scrambling (default).

5.9.6 OAM Cell Generation

This field is used to allow or prevent internally-generated OAM cells, such as OAM fault management cells, which were generated at a PVC endpoint, from being sent out this cell port. They are passed out through this cell port towards other remote devices which have the capability to process them. Some ATM equipment cannot properly process the received OAM cells. This option should only be enabled if the endpoint devices have this capability.

Enable OAM Cell Generation if these internally-generated OAM cells are to be passed through this cell port. Disable OAM Cell Generation to prevent OAM cells from being passed through the cell port. The OAM Cell Generation options are:

Enabled Allows internally-generated OAM cells to be passed through this port.

Disabled Prevents internally-generated OAM cells from being passed through this port (default). When disabled, the OAM cells that would have passed out this cell port are simply not generated.

NOTE End-to-end OAM cells already on virtual channel connections are passed out this cell port.

5.9.7 Setting the Maximum Burst Size

If a device on the far end requires a fixed burst size, the maximum burst size can be set for this port. The options are:

32 cells Sets the maximum burst size to 32 cells.

105 cells Sets the maximum burst size to 105 cells.

210 cells Sets the maximum burst size to 210 cells.

Maximum cells Sets the maximum burst size to the allowed maximum number of consecutive cells (default).

5.9.8 Specifying a Transmit Clock Source

Port Tx Clock specifies the source of the port's transmit clock.

When the transmit clock source is set to `System Clk`, the port uses the *CellPath* 300 system reference clock as its transmit clock. Use this setting when the *CellPath* 300 is to provide the timing reference for the network or terminal equipment attached to this port.

NOTE For DSX-1 ports, data is always received using a clock signal recovered from the incoming data; the *CellPath* 300 does not clock data asynchronously.

When the transmit clock source is set to `Loop Rx`, the *CellPath* 300 derives a clock signal from the port's receive channel data stream, and uses the derived signal as the port's transmit clock. Use this setting when the network or terminal equipment provides the timing for the *CellPath* 300. Use this option when the *CellPath* 300 timing source is not synchronized with the network or other equipment connected to this port. The Port Tx Clock options are:

System Clk Use *CellPath* 300 system reference clock as port transmit clock (default).

Loop Rx Derive a clock signal from the port's receive channel data stream.

When a cell/DSX-1 port is used as the source for the system reference clock, this parameter should be set to `Loop Rx`.

5.9.9 Setting the Line Coding

The DS1 line coding method is Binary 8 Zeroes Substitution (B8ZS). There is only one value for this parameter so it is not user-selectable.

5.9.10 Selecting a Framing Format

Use the `Framing Format` field to specify the DSX-1 framing format used by the port. The port must be set to recognize and transmit data using the same framing format as the network or device to which it is connected. The Framing format options are:

ESF Extended Super Frame (default)

SF (D4) Super Frame (D4)

5.9.11 Specifying the Line Build Out Attenuation

The *Cellpath* 300 can be set to attenuate the DS1 signal before outputting it at the link. The Line Build Out options are:

0.0dB	0.0 dB line attenuation (default)
7.5 dB	7.5 dB line attenuation
15.0 dB	15 dB line attenuation
22.5 dB	22.5 dB line attenuation

5.9.12 Using Loopbacks

Group Loopback is used for testing only. When the `Group Loopback` field is set to run `Line`, `Payload`, or `Local` loopbacks, all links in the group are looped back. Refer to *CellPath 300 ATM WAN Multiplexer Installation and Maintenance Manual* for more information about the `Group Loopback` field.

5.9.13 Exiting the Screen

The `[^Apply]` button applies any changes made in the screen, without exiting the screen. The keyboard equivalent is `<Ctrl-A>`.

The `[^OK]` button applies any changes made in the screen, then exits the screen. The keyboard equivalent is `<Ctrl-O>`.

The `[^Cancel]` button exits the screen without applying any changes made in the screen. The keyboard equivalent is `<Ctrl-C>`.

5.10 Setting Up a Cell/IMA E1 Group

The following pages describe how to setup a port that is transmitting or receiving IMA cells over a E1 line. Fields that must be set to configure this port include `Port Name`, `Circuit Identifier`, `Port Alarm Mode`, `Port Protocol`, `ATM Payload Scrambling`, `Port Tx Clock`, `Framing Format`, and `Line Coding`. Ensure that `Port Loopback` is set to `None`.

5.10.1 Accessing the Screen

The `Cell/IMA E1 PLM Setup` screen (Figure 5.11) is accessed from the `Port Selection` screen for a IMA E1 module.

To access the port selection screen from the *CellPath* 300 `System Configuration` screen, scroll to a slot containing a multiport module (IMA E1 PLM attached to a Cell PM) and press the <ENTER> key. Within the port selection screen, scroll to the port to be configured and press the <ENTER> key.

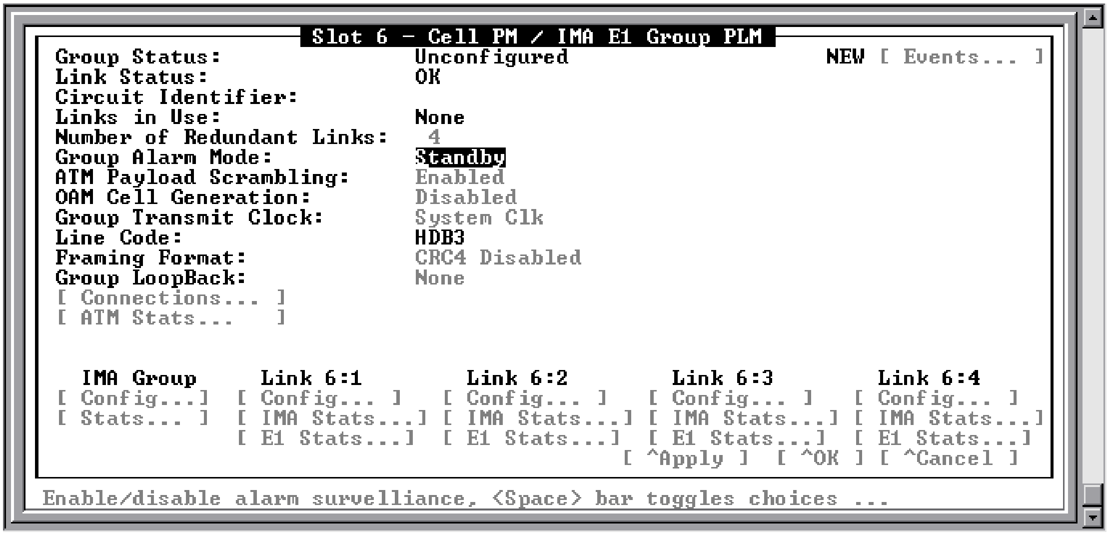


Figure 5.11 - Cell/IMA E1 PLM Setup Screen

5.10.2 Specifying a Circuit Identifier

The Circuit Identifier parameter is a text string up to 255 characters long that uniquely identifies the circuit. This identifier is specified by the circuit vendor when setting up the circuit. The identifier should be recorded in this field, since it can be useful when communicating with the vendor during troubleshooting. Additional information such as a description of what the circuit is connected to can also appear in this field.

5.10.3 Setting the Number of Redundant Links

This option specifies the number of links the system can lose from this group while retaining sufficient bandwidth for the application. The options are 0, 1, 2, 3, or 4 redundant links. The default is 4.

5.10.4 Setting the Group Alarm Mode

The Group Alarm Mode field allows turning alarm reporting on and off. During normal operation, alarm reporting should be on Active, which logs each alarm into the Event History Report and can generate an SNMP trap. Turn alarm reporting off: (1) if the port is not in use; (2) during installation; or (3) when the port is expected to experience problems (i.e., during testing). The status of alarm reporting has no effect on data flowing through the port, or on connections terminating or originating at the port. The alarm reporting options are:

Active Turn on alarm reporting.

Standby Turn off alarm reporting (default).

Table 5.10 - Cell/IMA E1 Group Alarm Mode

An Alarm at the Port	If Active	If Standby
Turns the IN and/or OUT port LEDs to red	Yes	Yes
Displays the word NEW next to the Events button at the top of every screen	Yes	No
Logs the alarm in the Event History Report	Yes	No
Generates an SNMP trap for the alarm (if traps are enabled)	Yes	No
Reported in the Port Status field on the configuration and statistics screens	Yes	Yes

5.10.5 Enabling/Disabling Cell Payload Scrambling

The ATM Payload Scrambling parameter enables or disables ATM cell payload scrambling, which removes long strings of 1s and 0s that could be mistaken as error conditions. Turn scrambling on to connect the *CellPath* 300 to terminal equipment that has scrambling enabled. The ATM Payload Scrambling options are:

On Turn on payload scrambling (default).

Off Turn off payload scrambling.

5.10.6 OAM Cell Generation

This field is used to allow or prevent internally-generated OAM cells, such as OAM fault management cells, which were generated at a PVC endpoint, from being sent out this cell port. They are passed out through this cell port towards other remote devices which have the capability to process them. Some ATM equipment cannot properly process the received OAM cells. This option should only be enabled if the endpoint devices have this capability.

Enable OAM Cell Generation if these internally-generated OAM cells are to be passed through this cell port. Disable OAM Cell Generation to prevent OAM cells from being passed through the cell port. The OAM Cell Generation options are:

Enabled Allows internally-generated OAM cells to be passed through this port.

Disabled Prevents internally-generated OAM cells from being passed through this port (default). When disabled, the OAM cells that would have passed out this cell port are simply not generated.

NOTE End-to-end OAM cells already on virtual channel connections are passed out this cell port.

5.10.7 Setting the Maximum Burst Size

If a device on the far end requires a fixed burst size, the maximum burst size can be set for this port. The options are

32 cells Sets the maximum burst size to 32 cells.

105 cells Sets the maximum burst size to 105 cells.

210 cells Sets the maximum burst size to 210 cells.

Maximum cells Sets the maximum burst size to the allowed maximum number of consecutive cells (default).

5.10.8 Specifying a Transmit Clock Source

`Port Tx Clock` specifies the source of the port's transmit clock.

When the transmit clock source is set to `System Clk`, the port uses the *CellPath* 300 system reference clock as its transmit clock. Use this setting when the *CellPath* 300 is to provide the timing reference for the network or terminal equipment attached to this port.

NOTE For E1 ports, data is always received using a clock signal recovered from the incoming data; the *CellPath* 300 does not clock data asynchronously.

When the transmit clock source is set to `Loop Rx`, the *CellPath* 300 derives a clock signal from the port's receive channel data stream, and uses the derived signal as the port's transmit clock. Use this setting when the network or terminal equipment provides the timing for the *CellPath* 300. Use this option when the *CellPath* 300 timing source is not synchronized with the network or other equipment connected to this port. The Port Tx Clock options are:

System Clk Use the *CellPath* 300 system reference clock as the port's transmit clock (default).

Loop Rx Derive a clock signal from the port's receive channel data stream.

When a cell/E1 port is used as the source for the system reference clock, this parameter should be set to `Loop Rx`.

5.10.9 Line Coding

The line coding technique for the IMA E1 group is High Density Bipolar 3-Zeroes (HDB3). There is only one value for this parameter so it is not user-selectable.

5.10.10 Framing Format

This field provides selection for CRC4 Error Checking. Toggle through the selections by pressing the `[Space Bar]`.

CRC4 Error Checking specifies whether or not the E1 port performs a CRC4 error check on all data received. The available options are:

CRC4 Disabled Disable CRC4 error checking.

CRC4 Enabled Enable CRC4 error checking.

5.10.11 Using Loopbacks

Group Loopback is used for testing only. When the `Group Loopback` field is set to run loopbacks, all links in the group are looped back. Refer to the *CellPath 300 ATM WAN Multiplexer Installation and Maintenance Manual* for more information about the `Port Loopback` field.

5.10.12 Exiting the Screen

The `[^Apply]` button applies any changes made in the screen, without exiting the screen. The keyboard equivalent is `<Ctrl-A>`.

The `[^OK]` button applies any changes made in the screen, then exits the screen. The keyboard equivalent is `<Ctrl-O>`.

The `[^Cancel]` button exits the screen without applying any changes made in the screen. The keyboard equivalent is `<Ctrl-C>`.

5.11 Configuring an IMA Group

Use the `IMA Group Configuration` screen to select the links to include in the group and then enable them as a group. The links are individually set to `Enable` by default.

5.11.1 Accessing the Screen

The `IMA Group Configuration` screen is accessed by selecting the `IMA Group [Config...]` button from the Cell PM / IMA DS1 or E1 PLM Setup Screen. Selecting this button displays the `Group Configuration` screen (Figure 5.12).

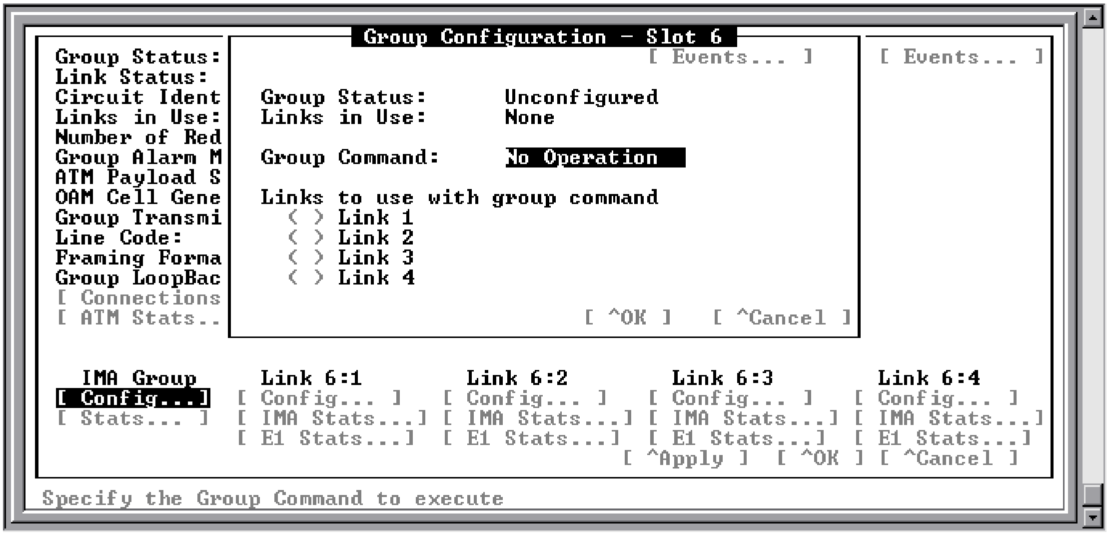


Figure 5.12 - IMA Group Configuration Screen

5.11.2 Group Command

The group command allows the group to be enabled or disabled. After initial configuration, when the group is enabled and operations, the **Add Link(s)** or **Delete Link(s)** commands can also be used. The group command options are:

Enable Groups Enable the group. Each link that is specified to be included in the group must be enabled and its status OK.

Disable Groups Disable the group. If the group is disabled, links cannot be added or deleted.

Add Link(s) Add links to the existing group. This command allows a link to be added without bringing the group down if no error conditions exist for the group. To add a link, first Enable the link on one end, then Enable and Add the link on the other end; the link first enabled is added automatically.

Delete Link(s) Delete links from the existing group. This command allows a link to be deleted without bringing the group down if no error conditions exist for the group.

5.11.3 Links to Use with Group Command

This field allows links to be specified to be included in the group. The link options are:

(X) Include this link in the IMA group.

( ) Do not include this link in the IMA group.

5.12 Configuring an IMA Link

Use the Link Configuration screen to enable or disable Link Use Mode, enable or disable Link Alarm Mode, or to provide the link a descriptive name.

5.12.1 Accessing the Screen

Access the Link Configuration screen from the Cell/IMA DS1 or E1 Group PLM screen by selecting the Link [Config...] button of the appropriate port to be configured. The Link Configuration screen is displayed in Figure 5.13.

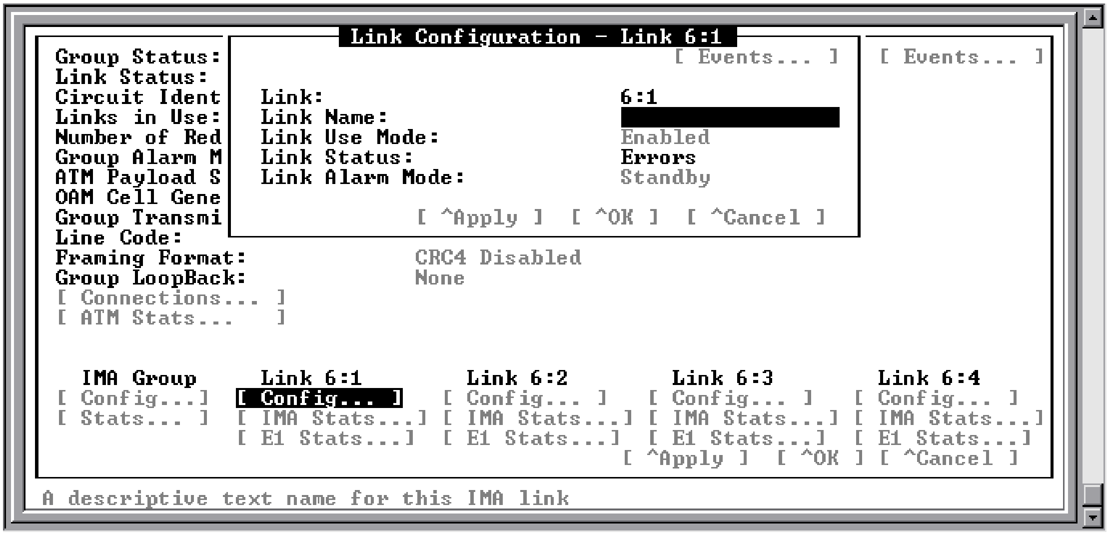


Figure 5.13 - IMA Link Configuration Screen

5.12.2 Setting the Link Name

The Link Name parameter is a test string up to 31 characters long that can be used to identify the link.

5.12.3 Specifying Link Use Mode

Use this field to specify whether a link can participate in the group. Set this field to `Disable` if the link is not to be included in the group. By setting it to `Enable`, a link can be remotely added to the group, however, alarms can still be generated even when the link is not included in the group. In this case, `Link Alarm Mode` should be set to `Disable`.

During normal operation, the link should be set to `Disable` to prevent line problems from affecting the entire groups bandwidth. The link must be deleted from the group before disabling a link. The link use options are:

Enable This link may be included in the IMA Group (default).

Disable The link cannot be included in the IMA Group.

5.12.4 Setting the Link Alarm Mode

The `Link Alarm Mode` field allows turning alarm reporting on and off for each link in the group. During normal operation, alarm reporting should be on `Active`, which logs each alarm into the `Event History Report` and can generate an SNMP trap. Turn alarm reporting off: (1) if the link is not in use; (2) during installation; or (3) when the link is expected to experience problems (i.e., during testing). The status of alarm reporting has no effect on data flowing through the link, or on connections terminating or originating at the link. The alarm reporting options are:

Active Turn on alarm reporting for this link.

Standby Turn off alarm reporting for this link (default).

Table 5.11 - Cell/IMA DS1 Link Alarm Mode

An Alarm at the Port	If Active	If Standby
Turns the IN and/or OUT port LEDs to red	Yes	Yes
Displays the word NEW next to the `Events` button at the top of every screen	Yes	No
Logs the alarm in the `Event History Report`	Yes	No
Generates an SNMP trap for the alarm (if traps are enabled)	Yes	No
Reported in the `Link Status` field on the configuration and statistics screens	Yes	Yes

5.13 Configuring a Packet/DS3 Port

The following pages describe how to configure a port that is transmitting or receiving packets over a DS3 line. Fields that must be set to configure this port include `Port Name`, `Circuit Identifier`, `Port Alarm Mode`, `Packet Protocol`, `Header Length`, `CRC Length`, `Max Packet Length`, `Reassembly Time Out`, `Closed Loop Flow Control`, `Port Tx Clock`, `Framing Format`, and `Line Coding`. Ensure that `Port Loopback` is set to `None`.

5.13.1 Accessing the Screen

To access the port selection screen from the *CellPath* 300 `System Configuration` screen, scroll to a slot containing a Packet/DS3 module and press the `<ENTER>` key.

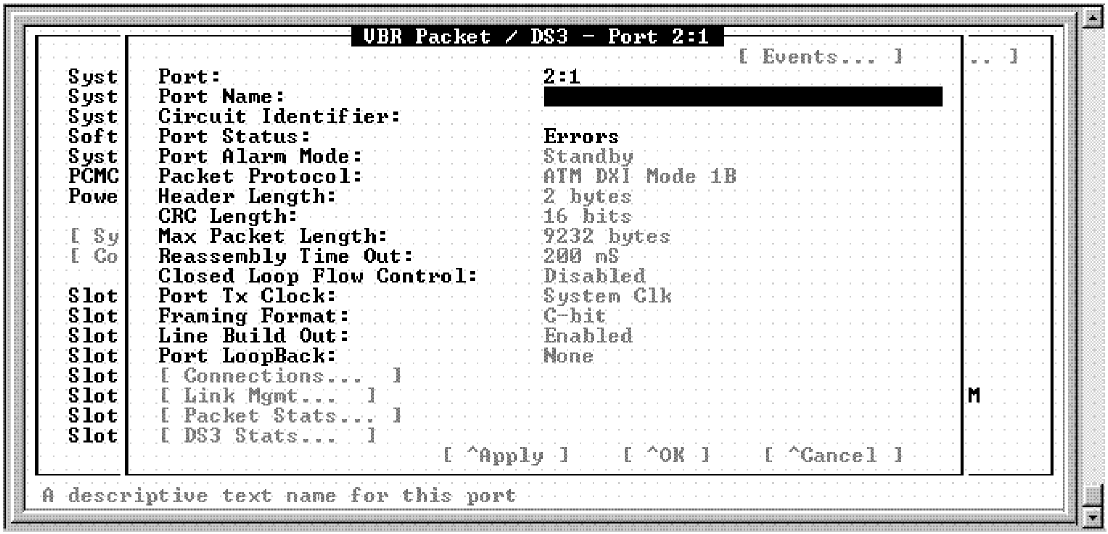


Figure 5.14 - Packet/DS3 Port Configuration Screen

5.13.2 Setting the Port Name

The `Port Name` parameter is a text string up to 31 characters long that is used to identify the port.

5.13.3 Specifying a Circuit Identifier

The `Circuit Identifier` parameter is a text string up to 255 characters long that uniquely identifies the circuit. This identifier is specified by the circuit vendor when setting up the circuit. The identifier should be recorded in this field, since it can be useful when communicating with the vendor during troubleshooting. Additional information such as a description of what the circuit is connected to can also appear in this field.

5.13.4 Setting the Port Alarm Mode

The `Port Alarm Mode` field allows turning alarm reporting on and off. During normal operation, alarm reporting should be on `Active`, which logs each alarm into the `Event History Report` and can generate an SNMP trap. Turn alarm reporting off: (1) if the port is not in use; (2) during installation; or (3) when the port is expected to experience problems (i.e., during testing). The status of alarm reporting has no effect on data flowing through the port, or on connections terminating or originating at the port. The alarm reporting options are:

Active Turn on alarm reporting.

Standby Turn off alarm reporting (default).

Table 5.12 - Packet / DS3 Port Alarm Mode

An Alarm at the Port	If Active	If Standby
Turns the IN and / or OUT port LEDs to red	Yes	Yes
Displays the word NEW next to the `Events` button at the top of every screen	Yes	No
Logs the alarm in the `Event History Report`	Yes	No
Generates an SNMP trap for the alarm (if traps are enabled)	Yes	No
Reported in the `Port Status` field on the configuration and statistics screens	Yes	Yes

5.13.5 Setting the Packet Protocol

Use the `Packet Protocol` field to configure the port for the protocol used by the device connected to the port. Match the selection to the service and protocol of the connecting device. The Packet Protocol options are:

ATM DXI Mode 1B For one or more AAL3/4 or AAL5 connections to equipment capable of generating and receiving ATM DXI or Frame Relay frames (default).

Frame Relay UNI For one or more AAL5 connections to equipment capable of generating and receiving Frame Relay frames.

SMDS DXI Not supported in this release of the *CellPath* 300.

SMDS KCI Not supported in this release of the *CellPath* 300.

HDLC For a single connection to equipment capable of generating and receiving generic HDLC frames.

5.13.6 Setting the Header Length

The `Header Length` parameter specifies the number of bytes sent in the packet's header. Set this parameter to match the network or terminal equipment attached to the port.

This parameter only applies when `Packet Protocol` is set to `ATM DXI` or `Frame Relay UNI`. It has no effect otherwise. The `Header Length` options are:

2 bytes Send two-byte headers (default). Two-byte headers provide four bits in which to specify the VPI, and six bits in which to specify the VCI.

4 bytes Send four-byte headers. Four-byte headers allow the use up to eight bits for the VPI, and 16 bits for the VCI, of which nine may be used with the *CellPath* 300. Four-byte headers allow the use of more DFAs, and thus allows the configuration of more simultaneous connections.

5.13.7 Setting CRC Length

Use the `CRC Length` field to specify whether a 16-bit or 32-bit CRC is used for error-checking on incoming packets and encoding on outgoing packets.

Set this parameter to match the CRC length used by the equipment connected to the port. Otherwise, the *CellPath* 300 discards all incoming packets, and the terminal equipment discards all outgoing ones. The CRC Length options are:

16 bits Use 16-bit CRC (default).

32 bits Use 32-bit CRC.

5.13.8 Setting the Maximum Packet Length

Use the Max Packet Length field to specify the maximum length (in bytes) of a packet that this port receives and reassemble. The options for packet size are:

1154 bytes

1538 bytes

2308 bytes

4616 bytes

9232 bytes (default)

NOTE

The actual length of transmitted packets is determined by the transmitting device. This parameter only specifies the maximum-length packet that this port is able to reassemble.

Longer packets limit the number of simultaneous reassembly processes. The *CellPath* 300 has a finite amount of memory for packet reassembly. The larger the packet size, the fewer packets fit in this memory. Since the length of a packet is determined by the transmitting device, it is usually safest to leave this parameter at its highest possible value, and only reduce it in an attempt to improve performance if it is known that the transmitting device sends packets longer than the specified maximum packet length.

5.13.9 Setting Reassembly Time Out

Use the Reassembly Time Out field to specify the maximum time allowed (in milliseconds) for a packet to be reassembled from the ATM cell stream before the packet is considered lost or corrupted and thereby discarded.

If long packets (>4500 bytes) are being used and multiple packets are interleaved, it may be necessary to set this parameter greater than 200 ms to avoid throwing away otherwise good packets. Very long packets can easily exceed the 200 ms default limit for reassembly. The Reassembly Time Out options are:

200ms (default)

500ms

1000ms

5.13.10 Enabling Closed Loop Flow Control

Closed loop flow control is used to handle short term burst situations where data from a higher speed module is being sent out over a lower speed line. This option provides a buffering scheme that slows the rate of data placed on the output line when the output line becomes congested. The options are:

Enabled Turn on closed loop flow control to buffer the data going to the output line.

Disabled Turn off closed loop flow control to disable the buffering of data to the output line regardless of any congestion problem (default).

5.13.11 Specifying a Transmit Clock Source

`Port Tx Clock` specifies the source of the port's transmit clock. When the transmit clock source is set to `System Clk`, the port uses the *CellPath* 300 system reference clock as its transmit clock. Use this setting when the *CellPath* 300 is to provide the timing reference for the network or terminal equipment attached to this port.

NOTE

For DS3 ports, data is always received using a clock signal recovered from the incoming data; the *CellPath* 300 does not clock data asynchronously.

When the transmit clock source is set to `Loop Rx`, the *CellPath* 300 derives a clock signal from the port's receive channel data stream, and uses the derived signal as the port's transmit clock. Use this setting when the network or terminal equipment provides the timing for the *CellPath* 300. Use this option when the *CellPath* 300 timing source is not synchronized with the network or other equipment connected to this port. The Port Tx Clock options are:

System Clk Use the *CellPath* 300 system reference clock as the port's transmit clock (default).

Loop Rx Derive a clock signal from the port's receive channel data stream.

When a Packet/DS3 port is used as the source for the system reference clock, this parameter should be set to `Loop Rx`.

5.13.12 Selecting a Framing Format

Use the Framing Format field sets the framing format for this port. Set the framing format to C-bit to connect the port to networks or terminal equipment supporting C-bit parity framing. Set the framing format to M23 when the network or terminal equipment to which the port is connected is not capable of being run in C-bit parity mode. The Framing Format options are:

C-bit Standard option for ATM (default)

M23 Use this option when the network or terminal equipment to which the port is connected is not capable of being run in C-bit parity mode.

5.13.13 Adjusting for Line Build Out

Line Build Out adjust the DS3 signal level based on the amount of cable between the *CellPath* 300 and the nearest repeater or terminal equipment. The Line Build Out options are:

Enabled Normal setting (default)

Disabled Use this setting when the port is attached to a long cable (>225 ft. (60 m)) and experiencing bit-error-rate problems.

5.13.14 Using Loopbacks

The Port Loopback field is used for setting and resetting loopbacks during troubleshooting. For normal operation, set the Port Loopback field to None. Refer to the *CellPath 300 ATM WAN Installation and Maintenance Manual* for more information about the Port Loopback field.

5.13.15 Exiting the Screen

The `[^Apply]` button applies any changes made in this screen, without exiting the screen. The keyboard equivalent is `<Ctrl-A>`.

The `[^OK]` button applies any changes made in this screen, then exits the screen. The keyboard equivalent is `<Ctrl-O>`.

The `[^Cancel]` button exits the screen without applying any changes made in the screen. The keyboard equivalent is `<Ctrl-C>`.

5.14 Configuring a Packet/E3 Port

The following pages describe how to configure a port that is transmitting or receiving packets over an E3 line. Fields that must be set to configure this port include `Port Name`, `Circuit Identifier`, `Port Alarm Mode`, `Packet Protocol`, `Header Length`, `CRC Length`, `Max Packet Length`, `Reassembly Time Out`, `Closed Loop Flow Control`, `Port Tx Clock`, `Framing Format`, and `Line Build Out`. Ensure that `Port Loopback` is set to `None`.

5.14.1 Accessing the Screen

To access the `Port Selection` screen from the *CellPath* 300 `System Configuration` screen, scroll to a slot containing a packet/E3 module.

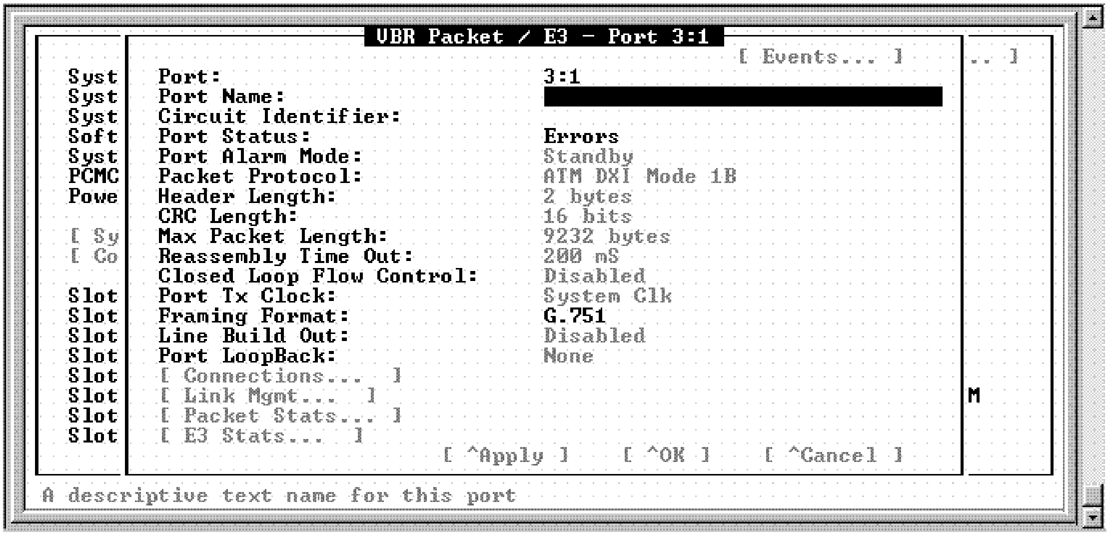


Figure 5.15 - Packet/E3 Port Configuration Screen

NOTE

If the E1 port is on a Tri V.35/EIA-530 & E1 module, it can be programmed for packet or CBR traffic. See Section 5.1.2 for instructions about how to do this.

5.14.2 Setting the Port Name

The `Port Name` parameter is a text string up to 31 characters long that is used to identify the port.

5.14.3 Specifying a Circuit Identifier

The `Circuit Identifier` parameter is a text string up to 255 characters long that uniquely identifies the circuit. This identifier is specified by the circuit vendor when setting up the circuit. The identifier should be recorded in this field, since it can be useful when communicating with the vendor during troubleshooting. Additional information such as a description of what the circuit is connected to can also appear in this field.

5.14.4 Setting the Port Alarm Mode

The `Port Alarm Mode` field allows turning alarm reporting on and off. During normal operation, alarm reporting should be on (Active), which logs each alarm into the `Event History Report` and can generate an SNMP trap. Turn alarm reporting off: (1) if the port is not in use; (2) during installation; or (3) when the port is expected to experience problems (i.e., during testing). The status of alarm reporting has no effect on data flowing through the port, or on connections terminating or originating at the port. The alarm reporting options are:

Active Turn on alarm reporting.

Standby Turn off alarm reporting (default).

Table 5.13 - Packet/E3 Port Alarm Mode

An Alarm at the Port	If Active	If Standby
Turns the IN and/or OUT port LEDs to red	Yes	Yes
Displays the word NEW next to the `Events` button at the top of every screen	Yes	No
Logs the alarm in the `Event History Report`	Yes	No
Generates an SNMP trap for the alarm (if traps are enabled)	Yes	No
Reported in the `Port Status` field on the configuration and statistics screens	Yes	Yes

5.14.5 Setting the Packet Protocol

Use the Packet Protocol field to configure the port for the protocol used by the device connected to the port. Match the selection to the service and protocol of the connecting device. The Packet Protocol options are:

ATM DXI Mode 1B For one or more AAL3/4 or AAL5 connections to equipment capable of generating and receiving ATM DXI or Frame Relay frames (default)

Frame Relay UNI For one or more AAL5 connections to equipment capable of generating and receiving Frame Relay frames

SMDS DXI Not supported in this release of the *CellPath* 300.

SMDS KCI Not supported in this release of the *CellPath* 300.

HDLC For a single connection to equipment capable of generating and receiving generic HDLC frames

5.14.6 Setting the Header Length

The Header Length parameter specifies the number of bytes sent in the packet's header. Set this parameter to match the network or terminal equipment attached to the port.

This parameter only applies when Packet Protocol is set to `ATM DXI` or `FR UNI`. It has no effect otherwise. The Header Length options are:

2 bytes Send two-byte headers (default). Two-byte headers allow four bits in which to specify the VPI, and six bits in which to specify the VCI.

4 bytes Send four-byte headers. Four-byte headers allow the use up to eight bits for the VPI, and 16 bits for the VCI, of which nine may be used with the *CellPath* 300. Four-byte headers allow the use of more DFAs, and thus allow more simultaneous connections be configured.

5.14.7 Setting CRC Length

Use the CRC Length field to specify whether a 16-bit or 32-bit CRC is used for error-checking on incoming packets and encoding on outgoing packets.

Set this parameter to match the CRC length used by the equipment connected to the port. Otherwise, the *CellPath* 300 discards all incoming packets, and the terminal equipment discards all outgoing ones. The CRC Length options are:

16 bits Use 16-bit CRC (default).

32 bits Use 32-bit CRC.

5.14.8 Setting the Maximum Packet Length

Use the Max Packet Length field to specify the maximum length (in bytes) of a packet that this port receives and reassemble. The options for packet size are:

1154 bytes

1538 bytes

2308 bytes

4616 bytes

9232 bytes (default)

NOTE

The actual length of transmitted packets is determined by the transmitting device. This parameter only specifies the maximum-length packet that this port accepts.

Longer packets limit the number of simultaneous reassembly processes. The *CellPath* 300 has a finite amount of memory for packet reassembly. The larger the packet size, the fewer packets fit in this memory. Since the length of a packet is determined by the transmitting device, it is usually safest to leave this parameter at its highest possible value, and only reduce it in an attempt to improve performance if it is known that the transmitting device does not send packets longer than the specified maximum packet length.

5.14.9 Setting Reassembly Time Out

Use the Reassembly Time Out field to specify the maximum time allowed (in milliseconds) for a packet to be reassembled from the ATM cell stream before the packet is considered lost or corrupted and thereby discarded.

If long packets (>4500 bytes) are being used and multiple packets are interleaved, it may be necessary to set this parameter greater than 200 ms to avoid throwing away otherwise good packets. Very long packets can easily exceed the 200 ms default limit for reassembly. The Reassembly Time Out options are:

200ms (default)

500ms

1000ms

5.14.10 Specifying a Transmit Clock Source

Port Tx Clock specifies the source of the port's transmit clock.

When the transmit clock source is set to `System Clk`, the port uses the *CellPath* 300 system reference clock as its transmit clock. Use this setting when the *CellPath* 300 is to provide the timing reference for the network or terminal equipment attached to this port.

NOTE

For E3 ports, data is always received using a clock signal recovered from the incoming data; the *CellPath* 300 does not clock data asynchronously.

When the transmit clock source is set to `Loop Rx`, the *CellPath* 300 derives a clock signal from the port's receive channel data stream, and uses the derived signal as the port's transmit clock. Use this setting when the network or terminal equipment provides the timing for the *CellPath* 300. Use this option when the *CellPath* 300 timing source is not synchronized with the network or other equipment connected to this port. The Port Tx Clock options are:

System Clk Use the *CellPath* 300 system reference clock as the port's transmit clock (default).

Loop Rx Derive a clock signal from the port's receive channel data stream.

When a Packet/E3 port is used as the source for the system reference clock, this parameter should be set to `Loop Rx.`

5.14.11 Framing Format

The G.751 framing format is used with G.751 E3 interfaces. There is only one value for this parameter so it is not user-selectable.

5.14.12 Adjusting for Line Build Out

Line Build Out adjust the E3 signal level based on the amount of cable between the *CellPath* 300 and the nearest repeater or terminal equipment. The Line Build Out options are:

Enabled	Use this setting when the port is attached to a short cable (≤225 ft. (60 m)) and experiencing bit-error-rate problems.
Disabled	Normal setting (default)

5.14.13 Using Loopbacks

Port Loopback is used for testing only. To configure this port for normal operation, make sure this field is set to `None`. Refer to the *CellPath 300 ATM WAN Installation and Maintenance Manual* for more information about the Port Loopback field.

5.14.14 Exiting the Screen

The `[^Apply]` button applies any changes made in the screen, without exiting the screen. The keyboard equivalent is `<Ctrl-A>`.

The `[^OK]` button applies any changes made in the screen, then exits the screen. The keyboard equivalent is `<Ctrl-O>`.

The `[^Cancel]` button exits the screen without applying any changes made in the screen. The keyboard equivalent is `<Ctrl-C>`.

5.15 Configuring a Packet/J2 Port

The following pages describe how to configure a port that is transmitting or receiving packets over a J2 line. Fields that must be set to configure this port include `Port Name`, `Circuit Identifier`, `Port Alarm Mode`, `Packet Protocol`, `Header Length`, `CRC Length`, `CRC Length`, `Max Packet Length`, `Reassembly Time Out`, `Closed Loop Flow Control`, `Port Tx Clock`, and `Receive Equalization`.

5.15.1 Accessing the Screen

The `Packet/J2 Configuration` screen (Figure 5.16) is accessed from the *CellPath* 300 `System Configuration` screen by scrolling to a slot containing a Packet/J2 pair and pressing the <ENTER> key.

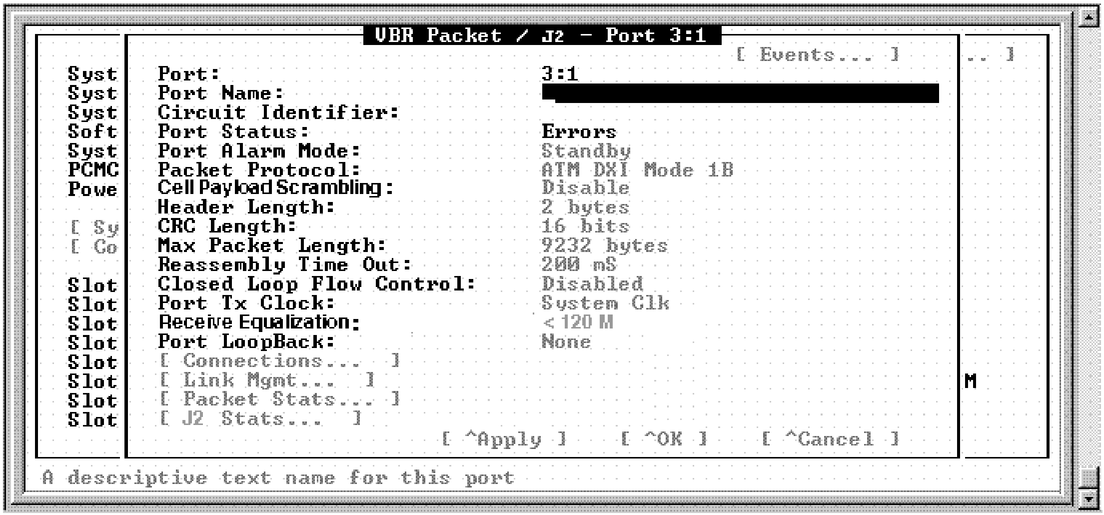


Figure 5.16 - Packet/J2 Port Configuration Screen

5.15.2 Setting the Port Name

The `Port Name` parameter is a text string up to 31 characters long used to identify the port.

5.15.3 Specifying a Circuit Identifier

The `Circuit Identifier` parameter is a text string up to 255 characters long that uniquely identifies the circuit. This identifier is specified by the circuit vendor when setting up the circuit. The identifier should be recorded in this field, since it can be useful when communicating with the vendor during troubleshooting. Additional information such as a description of what the circuit is connected to can also appear in this field.

5.15.4 Setting the Port Alarm Mode

The `Port Alarm Mode` field allows turning alarm reporting on and off. During normal operation, alarm reporting should be on (`Active`), which logs each alarm into the `Event History Report` and can generate an SNMP trap. Turn alarm reporting off: (1) if the port is not in use; (2) during installation; or (3) when the port is expected to experience problems (i.e., during testing). The status of alarm reporting has no effect on data flowing through the port, or on connections terminating or originating at the port. The alarm reporting options are:

Active Turn on alarm reporting.

Standby Turn off alarm reporting (default).

Table 5.14 - Packet/J2 Port Alarm Mode

An Alarm at the Port	If Active	If Standby
Turns the IN and/or OUT port LEDs to red	Yes	Yes
Displays the word NEW next to the `Events` button at the top of every screen	Yes	No
Logs the alarm in the `Event History Report`	Yes	No
Generates an SNMP trap for the alarm (if traps are enabled)	Yes	No
Reported in the `Port Status` field on the configuration and statistics screens	Yes	Yes

5.15.5 Setting the Packet Protocol

Use the `Packet Protocol` field to configure the port for the protocol used by the device connected to the port. Match the selection to the service and protocol of the connecting device. The `Packet Protocol` options are:

ATM DXI Mode 1B For one or more AAL3/4 or AAL5 connections to equipment capable of generating and receiving ATM DXI or Frame Relay frames (default). (This is the only packet protocol that supports VPCs.)

Frame Relay UNI For one or more AAL5 connections to equipment capable of generating or receiving Frame Relay frames.

HDLC For a single connection to equipment capable of generating and receiving generic HDLC frames.

5.15.6 Enabling/Disabling Cell Payload Scrambling

The `Cell Payload Scrambling` parameter enables or disables ATM cell payload scrambling, which removes long strings of 1s and 0s that could be mistaken as error conditions by some types of transmission equipment. Enable scrambling to connect the *CellPath* 300 to terminal equipment or a J2 network that has scrambling enabled.

The `Cell Payload Scrambling` options are:

Enable Enable payload scrambling.

Disable Disable payload scrambling (default).

5.15.7 Setting the Header Length

The `Header Length` parameter specifies the number of bytes sent in the packet's header. Set this parameter to match the network or terminal equipment attached to the port.

This parameter only applies when `Packet Protocol` is set to `ATM DXI` or `Frame Relay UNI`. It has no effect otherwise. The `Header Length` options are:

2 bytes Send two-byte headers (default). Two-byte headers provide four bits in which to specify the VPI, and six bits in which to specify the VCI.

4 bytes Send four-byte headers. Four-byte headers provide up to 8 bits for VPI, and 16 bits for VCI, nine of which may be used with the *CellPath* 300. Four-byte headers allow the use of more DFAs/DLCIs, and thus allow the configuration of more simultaneous connections.

5.15.8 Setting CRC Length

Use the `CRC Length` field to specify whether a 16-bit or 32-bit CRC is used for error-checking on incoming HDLC packets (frames) and encoding on outgoing HDLC packets (frames).

This parameter must be set to match the CRC length used by the equipment connected to the port. Otherwise, the *CellPath* 300 discards all incoming packets, and the terminal equipment discards all outgoing ones. The CRC Length options are:

16 bits	Use 16-bit CRC (default).
32 bits	Use 32-bit CRC.

5.15.9 Setting the Maximum Packet Length

Use the `Max Packet Length` field to specify the maximum length (in bytes) of a packet (frame) that this port receives and reassembles. The options for packet size are:

1154 bytes

1538 bytes

2308 bytes

4616 bytes

9232 bytes (default)

5.15.10 Setting Reassembly Time Out

Use the `Reassembly Time Out` field to specify the maximum time allowed (in milliseconds) for a packet to be reassembled from the ATM cell stream before the packet is considered lost or corrupted and thereby discarded.

If long packets (>4500 bytes) are being used and multiple packets are interleaved, set this parameter greater than 200 ms to avoid discarding otherwise good packets. Very long packets can easily exceed the 200 ms default limit for reassembly. The `Reassembly Time Out` options are:

100 ms

200 ms (default)

500 ms

1000 ms

5.15.11 Enabling Closed Loop Flow Control

`Closed Loop Flow Control` is used to handle short term burst situations where data from a higher speed module is being sent out over a lower speed line. This option enables a buffering scheme that slows the rate of data placed on the output line when the output line becomes congested. The options are:

Enabled Turn on closed loop flow control to buffer the data going to the output line.

Disabled Turn off closed loop flow control to disable the buffering of data to the output line regardless of any congestion problem (default).

5.15.12 Specifying a Transmit Clock Source

`Port Tx Clock` specifies the source of the port's transmit clock.

When the transmit clock source is set to `System Clk`, the port uses the *CellPath* 300 system reference clock as its transmit clock. Use this setting when the *CellPath* 300 is to provide the timing reference for the network or terminal equipment attached to this port.

NOTE For J2 ports, data is always received using a clock signal recovered from the incoming data; the *CellPath* 300 does not clock data asynchronously.

When the transmit clock source is set to `Loop Rx`, the *CellPath* 300 derives a clock signal from the port's receive channel data stream, and uses the derived signal as the port's transmit clock. Use this option when the *CellPath* 300 timing source is not synchronized with the network or other equipment connected to this port.

The `Port Tx Clock` options are:

System Clk Use the *CellPath* 300 system reference clock as the port's transmit clock (default).

Loop Rx Derive a clock signal from the port's receive channel data stream.

5.15.13 Adjusting for Receive Equalization

The `Receive Equalization` setting adjusts the J2 signal level based on the amount of cable between the *CellPath* 300 and the nearest repeater or terminal equipment. The `Rx Equalization` options are:

< 120 M	Normal setting (default).
> 120 M	Use this setting when the port is attached to a long cable (>120 M) and is experiencing bit-error-rate problems.

5.15.14 Using Loopbacks

`Port Loopback` is used for testing only. To configure this port for normal operation, ensure that this field is set to `None`. Refer to the *CellPath 300 ATM WAN Multiplexer Installation and Maintenance Manual* for more information about the `Port Loopback` field.

5.15.15 Exiting the Screen

The `[^Apply]` button applies any changes made in the screen, without exiting the screen. The keyboard equivalent is `<Ctrl-A>`.

The `[^OK]` button applies any changes made in the screen, then exits the screen. The keyboard equivalent is `<Ctrl-O>`.

The `[^Cancel]` button exits the screen without applying any changes made in the screen. The keyboard equivalent is `<Ctrl-C>`.

5.16 Configuring a Packet (10201)/V.35/EIA-530 Port

The following pages describe how to configure a port that is transmitting or receiving packets over a V.35/EIA-530 line. Fields that must be set to configure this port include `Port Name`, `Port Alarm Mode`, `Packet Protocol`, `Header Length`, `CRC Length`, `Max Packet Length`, `Reassembly Time Out`, `Closed Loop Flow Control`, `Clock Source`, `Port Mode`, `Port Clock Rate`, `Flow Control`, `LOS Detect`, and `In Clock Polarity`. Ensure that `Port Loopback` is set to `None`.

5.16.1 Accessing the Screen

Access this screen (Figure 5.17) from the *CellPath* 300 `System Configuration` screen by scrolling to a slot containing a packet/V.35/EIA-530 module and pressing the <ENTER> key.

NOTE

Data may pass with intermittent errors when two V.35/EIA-530 devices are not configured to identical electrical interface settings. Always verify that the devices are configured properly when they are unable to pass data 100% of the time.

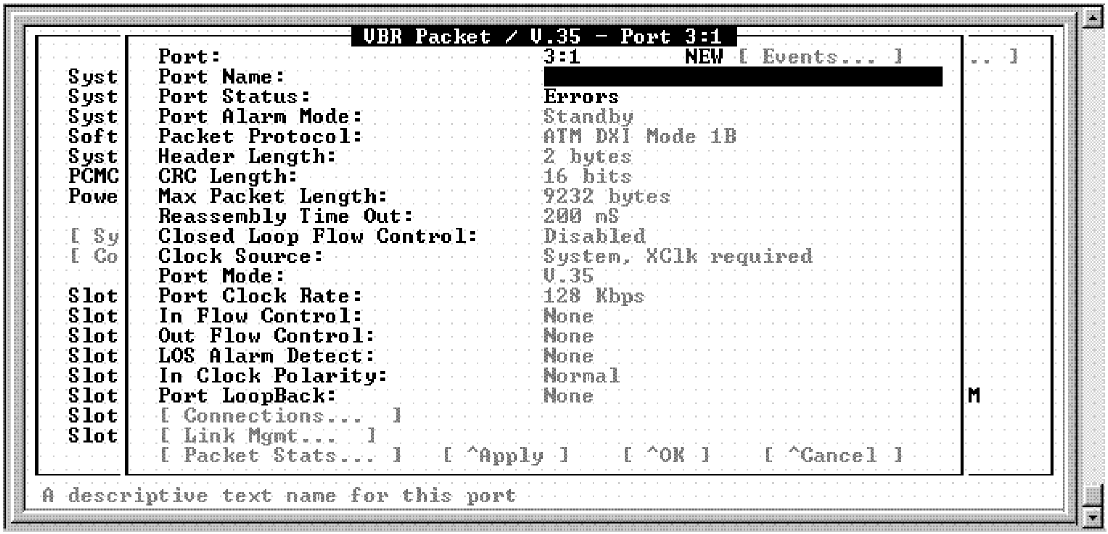


Figure 5.17 - Packet/V.35 Port Configuration Screen

NOTE

If the V.35/EIA-530 port is port 3 on a Tri V.35/EIA-530 & DSX-1 or E1 module, it can be programmed for packet or CBR traffic. See Section 5.1.2 for instructions about how to do this.

5.16.2 Setting the Port Name

The `Port Name` parameter is a text string up to 31 characters long that is used to identify the port.

5.16.3 Setting the Port Alarm Mode

The `Port Alarm Mode` field allows turning alarm reporting on and off. During normal operation, alarm reporting should be on `(Active)`, which logs each alarm into the `Event History Report` and can generate an SNMP trap. Turn alarm reporting off: (1) if the port is not in use; (2) during installation; or (3) when the port is expected to experience problems (i.e., during testing). The status of alarm reporting has no effect on data flowing through the port, or on connections terminating or originating at the port. The alarm reporting options are:

Active Turn on alarm reporting.

Standby Turn off alarm reporting (default).

Table 5.15 - Packet/V.35 Port Alarm Mode

An Alarm at the Port	If Active	If Standby
Turns the IN and/or OUT port LEDs to red	Yes	Yes
Displays the word NEW next to the `Events` button at the top of every screen	Yes	No
Logs the alarm in the `Event History Report`	Yes	No
Generates an SNMP trap for the alarm (if traps are enabled)	Yes	No
Reported in the `Port Status` field on the configuration and statistics screens	Yes	Yes

5.16.4 Setting the Packet Protocol

Use the `Packet Protocol` field to configure the port for the protocol used by the device connected to the port. Match the selection to the service and protocol of the connecting device. The `Packet Protocol` options are:

ATM DXI Mode 1B For one or more AAL3/4 or AAL5 connections to equipment capable of generating and receiving `ATM DXI` or `Frame Relay Frames` (default).

Frame Relay UNI For one or more AAL5 connections to equipment capable of generating and receiving Frame Relay frames.

SMDS DXI Not supported in this release of the *CellPath* 300.

HDLC For a single connection to equipment capable of generating and receiving generic HDLC frames.

5.16.5 Setting the Header Length

The `Header Length` parameter specifies the number of bytes sent in the packet's header. Set this parameter to match the network or terminal equipment attached to the port.

This parameter only applies when `Packet Protocol` is set to `ATM DXI` or `Frame Relay UNI.` It has no effect otherwise.

The `Header Length` options are:

2 bytes Send two-byte headers (default). Two-byte headers allows four bits in which to specify the VPI, and six bits in which to specify the VCI.

4 bytes Send four-byte headers. Four-byte headers allow the use up to eight bits for the VPI, and 16 bits for the VCI, of which nine may be used with the *CellPath* 300. Four-byte headers allow the use of more DFAs, and thus more simultaneous connections.

5.16.6 Setting CRC Length

Use the `CRC Length` field to specify whether a 16-bit or 32-bit CRC is used for error-checking on incoming packets and encoding on outgoing packets.

Set this parameter to match the CRC length used by the equipment connected to the port. Otherwise, the *CellPath* 300 discards all incoming packets, and the terminal equipment discards all outgoing ones.

The CRC Length options are:

16 bits Use 16-bit CRC (default).

32 bits Use 32-bit CRC.

5.16.7 Setting the Maximum Packet Length

Use the `Max Packet Length` field to specify the maximum length (in bytes) of a packet (frame) that this port receives and reassemble. The options for packet size are:

1154 bytes

1538 bytes

2308 bytes

4616 bytes

9232 bytes (default)

5.16.8 Setting Reassembly Time Out

Use the `Reassembly Time Out` field to specify the maximum time allowed (in milliseconds) for a packet to be reassembled from the ATM cell stream before the packet is considered lost or corrupted and thereby discarded.

If long packets (>4500 bytes) are being used and multiple packets are interleaved, it may be necessary to set this parameter greater than 200 ms to avoid throwing away otherwise good packets. Very long packets can easily exceed the 200 ms default limit for reassembly. The `Reassembly Time Out` options are:

200ms (default)

500ms

1000ms

5.16.9 Enabling Closed Loop Flow Control

`Closed Loop Flow Control` is used to handle short term burst situations where data from a higher speed module is being sent out over a lower speed line. This option enables a buffering scheme that slows the rate of data placed on the output line when the output line becomes congested. The options are:

Enabled Turn on closed loop flow control to buffer the data going to the output line.

Disabled Turn off closed loop flow control to disable the buffering of data to the output line regardless of any congestion problem (default).

5.16.10 Specifying Clock Sources

The `Clock Source` parameter specifies the source of the port's clocking signals.

5.16.10.1 System Clock When An External Clock Is Required

When the clock source is set to `System, XClk required`, the port uses the *CellPath* 300 system reference clock as the source for the outgoing clock signals. Incoming data is clocked with the interface's external clock signal. Use this setting when the *CellPath* 300 is to provide the timing reference for the network or terminal equipment attached to this port.

5.16.10.2 System Clock When An External Clock Is Not Available

When the clock source is set to `System, No XClk required`, the port uses the *CellPath* 300 system reference clock as the source for the outgoing clock signals. In this case, incoming data is also clocked with the *CellPath* 300 system reference clock. Use this setting when the *CellPath* 300 is to provide the timing reference for the network or terminal equipment attached to this port, but the equipment does not supply a synchronized external clock.

5.16.10.3 Looping the External Clock Signal

When the clock source is set to `Loop XClk`, the *CellPath* 300 uses the port's external clock signal as the source of the port's Rx clk signal and Tx clk signal. Use this option when the *CellPath* 300 timing source is not synchronized with the network or other equipment connected to this port.

5.16.11 Setting the Clock Rate

`Port Clk Rate` specifies the bit rate of the port in Kbps. Allowable values are integers from `56` to `2048`, in multiples of `56` or `64`, or `1544, 3088, 4096, 6176, 8192` Kbps. The default is `128` Kbps. Set this parameter to match the rate of the attached equipment.

5.16.12 Setting the Port Mode

`Port Mode` specifies the port to be V.35 or EIA-530 port. The `Port Mode` options are:

V.35 Use with V.35 ports (default).

EIA-530 Use with EIA-530, RS449, and X.21 ports.

NOTE An adapter cable may be required to make the connection to this port.

5.16.13 Setting Up Flow Control

The `In Flow Control` parameter determines how the port tells attached equipment to halt transmission temporarily, in order to avoid data overflows. Set this parameter to work with the setting of the attached equipment.

When the *CellPath* 300 receive buffer is nearly full (i.e., an overflow condition is impending), the setting of the `In Flow Control` parameter determines what action the *CellPath* 300 takes. The `In Flow Control` options are:

None Take no action on impending overflow; overflow may occur (default).

Gapped Clk Halt transmit clock on impending overflow.

DCD De-assert DCD on impending overflow.

CTS De-assert CTS on impending overflow.

DCD and CTS De-assert DCD and CTS on impending overflow.

The `Out Flow Control` parameter determines how the port senses when attached equipment is telling it to halt transmission, in order to avoid overflowing the equipment's receive buffer. Set this parameter to work with the setting of the attached equipment. The `Out Flow Control` options are:

None No signal halts transmission; overflow may occur (default).

DTR Halt transmission when attached equipment de-asserts DTR.

RTS Halt transmission when attached equipment de-asserts RTS.

DTR or RTS Halt transmission when DTR or RTS is de-asserted.

DTR and RTS Halt transmission when both DTR and RTS are de-asserted.

5.16.14 Setting LOS Alarm Detection

The `LOS Detect` parameter specifies which signals (if any) are used to detect when a `Loss of Signal` condition (`LOS`) exists. The `LOS Detect` options are:

None Alarms are never triggered (default) upon LOS.

DTR Trigger alarm when DTR is de-asserted.

RTS Trigger alarm when RTS is de-asserted.

DTR or RTS Trigger alarm when DTR or RTS are de-asserted.

DTR and RTS Trigger alarm when both DTR and RTS are de-asserted.

5.16.15 In Clock Polarity

Use this option when experiencing problems with error data. Inverting the clock changes the effective timing relationship between the clock and the data and may correct for a skew caused by transmission delay through a cable. The options are:

Normal The In Clock is not inverted (default).

Inverted Inverts the receive clock.

NOTE

The `In Clock Polarity` option is available with the Quad V.35/EIA-530 physical layer module and with Revision 3 or later Tri V.35/EIA-530 & DSX-1 and Tri V.35/EIA-530 & E1 physical layer modules.

5.16.16 Using Loopbacks

`Port Loopback` is used for testing only. To configure this port for normal operation, make sure this field is set to `None`. Refer to the *CellPath 300 ATM WAN Multiplexer Installation and Maintenance Manual* for more information about the `Port Loopback` field.

5.16.17 Exiting the Screen

The `[^Apply]` button applies any changes made in this screen, without exiting the screen. The keyboard equivalent is `<Ctrl-A>`.

The `[^OK]` button applies any changes made in this screen, then exits the screen. The keyboard equivalent is `<Ctrl-O>`.

The `[^Cancel]` button exits the screen without applying any changes made in the screen. The keyboard equivalent is `<Ctrl-C>`.

5.17 Configuring a Packet/HSSI Port

The following pages describe how to configure a port that is transmitting or receiving packets over a HSSI line. Fields that must be set to configure this port include `Port Name`, `Port Alarm Mode`, `Packet Protocol`, `Header Length`, `CRC Length`, `Max Packet Length`, `Reassembly Time Out`, `Closed Loop Flow Control`, `Clock Source`, `Clock Rate`, `Flow Control`, and `LOS Detect`.

5.17.1 Accessing the Screen

Access this screen from the *CellPath* 300 `System Configuration` screen by scrolling to a slot containing a Packet / HSSI module and pressing the <ENTER> key.

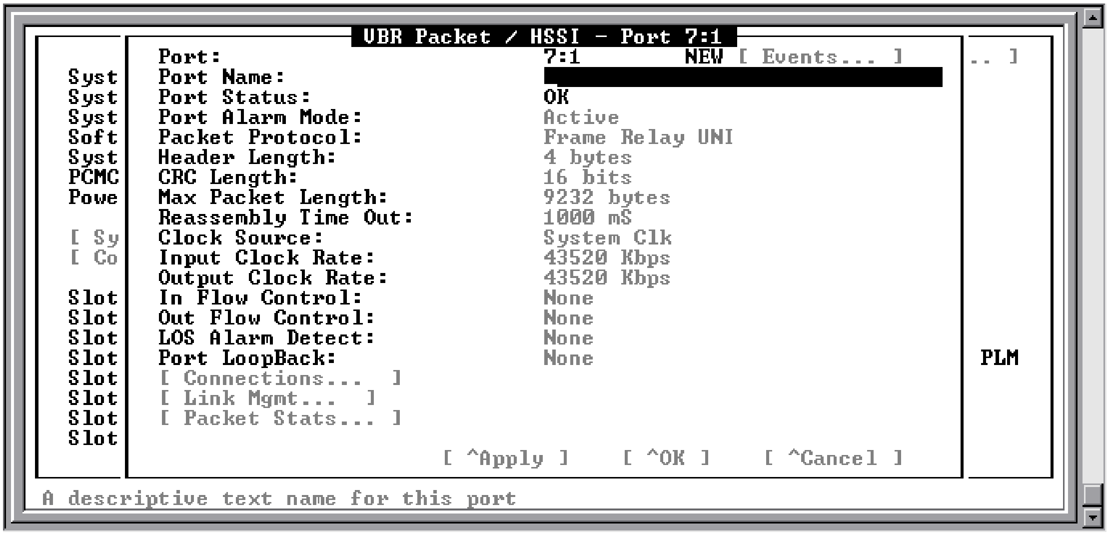


Figure 5.18 - Packet / HSSI Configuration Screen

5.17.2 Setting the Port Name

The `Port Name` parameter is a text string up to 31 characters long that can be used to identify the port.

5.17.3 Setting the Port Alarm Mode

The Port Alarm Mode field allows turning alarm reporting on and off. During normal operation, alarm reporting should be on (Active), which logs each alarm into the Event History Report and can generate an SNMP trap. Turn alarm reporting off: (1) if the port is not in use; (2) during installation; or (3) when the port is expected to experience problems (i.e., during testing). The status of alarm reporting has no effect on data flowing through the port, or on connections terminating or originating at the port. The alarm reporting options are:

Active Turn on alarm reporting.

Standby Turn off alarm reporting (default).

Table 5.16 - Packet / HSSI Port Alarm Mode

An Alarm at the Port	If Active	If Standby
Turns the IN and / or OUT port LEDs to red	Yes	Yes
Displays the word NEW next to the Events button at the top of every screen	Yes	No
Logs the alarm in the Event History Report	Yes	No
Generates an SNMP trap for the alarm (if traps are enabled)	Yes	No
Reported in the Port Status field on the configuration and statistics screens	Yes	Yes

5.17.4 Setting the Packet Protocol

Use this field to configure the port for the protocol used by the device connected to the port. Match the selection to the service and protocol of the connecting device. The Packet Protocol options are:

ATM DXI Mode 1B For one or more AAL3/4 or AAL5 connections to equipment capable of generating and receiving ATM DXI or Frame Relay frames (default). (This is the only packet protocol that supports VPCs.)

Frame Relay UNI For one or more AAL5 connections to equipment capable of generating and receiving Frame Relay frames.

SMDS DXI This option is not supported on this release of the *CellPath* 300.

HDLC For a single connection to equipment capable of generating and receiving generic HDLC frames.

5.17.5 Setting the Header Length

The `Header Length` parameter specifies the number of bytes sent in the packet's header. Set this parameter to match the network or terminal equipment attached to the port.

This parameter only applies when `Packet Protocol` is set to `ATM DXI` or `Frame Relay UNI.` It has no effect otherwise. The `Header Length` options are:

2 bytes Send two-byte headers (default). Two-byte headers provide four bits in which to specify the VPI, and six bits in which to specify the VCI.

4 bytes Send four-byte headers. Four-byte headers let provide up to 8 bits for VPI, and 16 bits for VCI, nine of which may be used with the *CellPath* 300. Four-byte headers allow the use of more DFAs/ DLCIs, and thus more simultaneous connections can be configured.

5.17.6 Setting CRC Length

Use the `CRC Length` field to specify whether a 16-bit or 32-bit CRC is used for error-checking on incoming HDLC packets (frames) and encoding on outgoing HDLC packets (frames).

Set this parameter to match the CRC length used by the equipment connected to the port. Otherwise, the *CellPath* 300 discards all incoming packets, and the terminal equipment discards all outgoing ones. The `CRC Length` options are:

16 bits Use 16-bit CRC (default).

32 bits Use 32-bit CRC.

5.17.7 Setting the Maximum Packet Length

Use the `Max Packet Length` field to specify the maximum length (in bytes) of a packet (frame) that this port receives and reassembles. The options for packet size are:

1154 bytes

1538 bytes

2308 bytes

4616 bytes

9232 bytes (default)

5.17.8 Setting Reassembly Time Out

Use the `Reassembly Time Out` field to specify the maximum time allowed (in milliseconds) for a packet to be reassembled from the ATM cell stream before the packet is considered lost or corrupted and thereby discarded.

If long packets (> 4500 bytes) are being used and have multiple packets are interleaved, set this parameter greater than 200 ms to avoid discarding otherwise good packets. Very long packets can easily exceed the 200 ms default limit for reassembly. The `Reassembly Time Out` options are:

100 ms
200 ms (default)
500 ms
1000 ms

5.17.9 Specifying Clock Sources

The `Clock Source` parameter specifies the source of the port's clocking signals.

5.17.9.1 System Clock When an External Clock is Required

When the clock source is set to `System, XClk required`, the port uses the *CellPath* 300 system reference clock as the source for the outgoing clock signals. Incoming data is clocked with the interface's external clock signal. Use this setting when the *CellPath* 300 is to provide the timing reference for the network or terminal equipment attached to this port.

5.17.9.2 Looping the External Clock Signal

When the clock source is set to `Loop XClk`, the *CellPath* 300 uses the port's external clock signal as the source of the port's Rx clk signal and Tx clk signal. Use this option when the *CellPath* 300 timing source is not synchronized with the network or other equipment connected to this port. The `Clock Source` options are:

System, XClk required — Use the *CellPath* 300 system reference clock as the source of the port's Rx clk signal and Tx clk signal (default).

Loop XClk — Use the port's Ext clk signal as the source of the port's Rx clk signal and Tx clk signal.

5.17.10 Selecting an Input Clock Rate

This field allows selection of the input clock bit rate (TSET-DCE) of the HSSI / VBR packet port. The range of values is from `1024` Kbps (1 Mbps) to `51200` Kbps (52 Mbps), in increments of `512` Kbps. Press `<F2>`, or `<Ctrl-P>`, to display a pop-up list of available clock rates. Position the cursor to select the desired rate and then press the `<ENTER>` key.

5.17.11 Selecting an Output Clock Rate

This field allows selecting the output bit rate (RSET-DCE) of the HSSI / VBR packet port. The range of values is from `1024` Kbps (1 Mbps) to `51200` Kbps (52 Mbps), in increments of `512` Kbps. Press `<F2>`, or `<Ctrl-P>`, to display a pop-up list of available clock rates. Position the cursor to select the desired rate and then press the <`ENTER`> key.

5.17.12 Setting Up Flow Control

The `In Flow Control` parameter determines how the port tells attached equipment to temporarily halt transmission, in order to avoid data overflows. Set this parameter to work with the setting of the attached equipment.

When the *CellPath* 300 input buffer is nearly full (i.e., an overflow condition is impending), the setting of the `In Flow Control` parameter determines what action the *CellPath* 300 takes. The `In Flow Control` options are:

None Take no action on impending overflow; overflow may occur (default).

Gapped Clk Halt transmit (TSET_DCE) clock on impending overflow.

Variable Clk Slot TSET_DCE clock on impending overflow.

DCR De-assert DCR on impending overflow.

The `Out Flow Control` parameter determines how the port senses when attached equipment is telling it to halt transmission, in order to avoid overflowing the equipment's receive buffer. Set this parameter to work with the setting of the attached equipment. The `Out Flow Control` options are:

None No signal halts transmission; overflow may occur (default).

DTR Halt transmission when attached equipment de-asserts DTR.

5.17.13 Setting the LOS Alarm Detection

The `LOS Detect` parameter specifies which signals (if any) are used to detect when a `Loss of Signal` condition (`LOS`) exists. The `LOS Detect` options are:

None	Alarms are never triggered upon LOS (default).
DTR	Trigger alarm when DTR is de-asserted.

5.17.14 Using Loopbacks

`Port Loopback` is used for testing only. To configure the *CellPath* 300 for normal operation, make sure this field is set to `None`. Refer to the *CellPath 300 ATM WAN Multiplexer Installation and Maintenance Manual* for more information about the `Port Loopback` field.

5.17.15 Exiting the Screen

The `[^Apply]` button applies any changes made in the screen, without exiting the screen. The keyboard equivalent is `<Ctrl-A>`.

The `[^OK]` button applies any changes made in the screen, then exits the screen. The keyboard equivalent is `<Ctrl-O>`.

The `[^Cancel]` button exits the screen without applying any changes made in the screen. The keyboard equivalent is `<Ctrl-C>`.

5.18 Configuring a Packet/DSX-1 Port

The following pages describe how to configure a port that is transmitting or receiving packets over a DSX-1 line. Fields that must be set to configure this port include `Port Name`, `Circuit Identifier`, `Port Alarm Mode`, `Packet Protocol`, `Header Length`, `CRC Length`, `Max Packet Length`, `Reassembly Time Out`, `Port Tx Clock`, `Framing Format`, `Line Coding`, and `Channelized Data`.

5.18.1 Accessing the Screen

Access a `Packet/DSX-1 Port Configuration` screen from the `Port Selection` screen for a multiport module attached to a packet or packet/CBR protocol module.

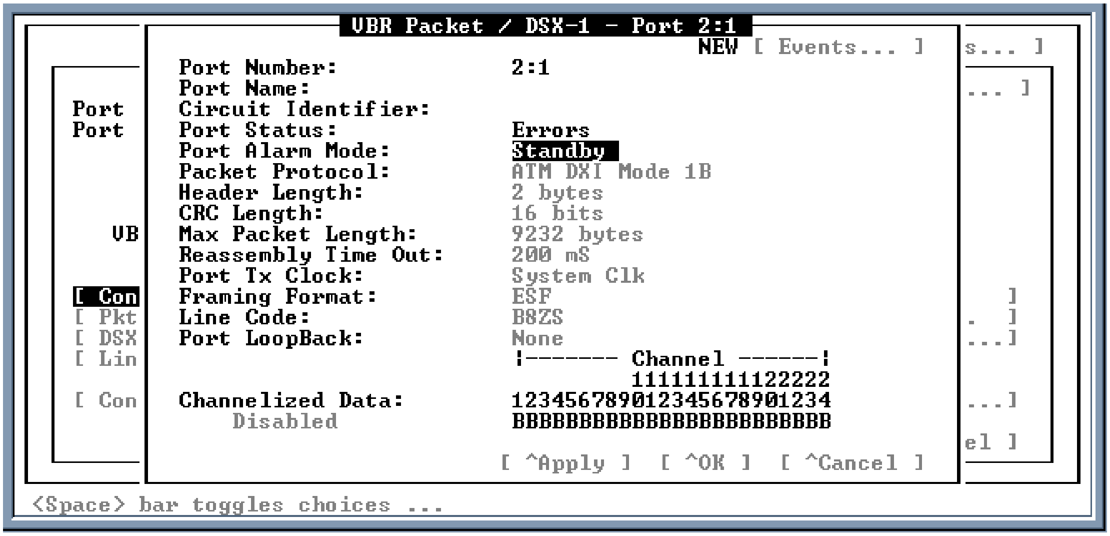


Figure 5.19 - Packet/DSX-1 Configuration Screen

To access the `Port Selection` screen from the *CellPath* 300 `System Configuration` screen, scroll to a slot containing a multiport module (Quad DSX-1 or Tri V.35/EIA-530 & DSX-1) and press the `<ENTER>` key. Within the port selection screen, tab to the port to be configured and press the `<ENTER>` key.

NOTE If the port has been configured to use Frame Relay UNI packet protocol, the port selection screen also includes a button that allows Frame Relay Link Management to be used to verify the integrity of the transmission lines.

NOTE If the DSX-1 port is on a Tri V.35/EIA-530 & DSX-1 module, it can be programmed for packet or constant bit rate traffic.

5.18.2 Setting the Port Name

The `Port Name` parameter is a text string up to 31 characters long that can be used to identify the port.

5.18.3 Specifying a Circuit Identifier

The `Circuit Identifier` parameter is a text string up to 255 characters long that uniquely identifies the circuit. This identifier is specified by the circuit vendor when setting up the circuit. The identifier should be recorded in this field, since it can be useful when communicating with the vendor during troubleshooting. Additional information, such as a description of what the circuit is connected to, can also appear in this field.

5.18.4 Setting the Port Alarm Mode

The `Port Alarm Mode` field allows turning alarm reporting on and off. During normal operation, alarm reporting should be on (Active), which logs each alarm into the `Event History Report` and can generate an SNMP trap. Turn alarm reporting off: (1) if the port is not in use; (2) during installation; or (3) when the port is expected to experience problems (i.e., during testing). The status of alarm reporting has no effect on data flowing through the port, or on connections terminating or originating at the port. The alarm reporting options are:

Active Turn on alarm reporting.

Standby Turn off alarm reporting (default).

Table 5.17 - Packet/DSX-1 Port Alarm Mode

An Alarm at the Port	If Active	If Standby
Turns the IN and/or OUT port LEDs to red	Yes	Yes
Displays the word NEW next to the `Events` button at the top of every screen	Yes	No
Logs the alarm in the `Event History Report`	Yes	No
Generates an SNMP trap for the alarm (if traps are enabled)	Yes	No
Reported in the `Port Status` field on the configuration and statistics screens	Yes	Yes

5.18.5 Setting the Packet Protocol

Use the `Packet Protocol` field to configure the port for the protocol used by the device connected to the port. Match the selection to the service and protocol of the connecting device. The `Packet Protocol` options are:

ATM DXI Mode 1B For one or more AAL3/4 or AAL5 connections to equipment capable of generating and receiving ATM DXI or Frame Relay frames (default). (This is the only packet protocol that supports VPCs.)

Frame Relay UNI For one or more AAL5 connections to equipment capable of generating and receiving Frame Relay frames.

SMDS DXI For a single connection to equipment capable of generating and receiving SMDS DXI frames.

SMDS KCI For a single connection to equipment capable of generating and receiving SMDS KCI frames.

HDLC For a single connection to equipment capable of generating and receiving generic HDLC frames.

5.18.6 Setting the Header Length

The `Header Length` parameter specifies the number of bytes sent in the packet's header. Set this parameter to match the network or terminal equipment attached to the port.

This parameter only applies when `Packet Protocol` is set to `ATM DXI` or `Frame Relay UNI`. It has no effect otherwise. The `Header Length` options are:

2 bytes Send two-byte headers (default). Two-byte headers provide four bits in which to specify the VPI, and six bits in which to specify the VCI.

4 bytes Send four-byte headers. Four-byte headers allow the use of up to 8 bits for VPI, and 16 bits for VCI, nine of which may be used with the *CellPath* 300. Four-byte headers allow the use of more DFAs/DLCIs, and thus more simultaneous connections.

5.18.7 Setting CRC Length

Use the `CRC Length` field to specify whether a 16-bit or 32-bit CRC is used for error-checking on incoming HDLC packets (frames) and encoding on outgoing HDLC packets (frames).

Set this parameter to match the CRC length used by the equipment connected to the port. Otherwise, the *CellPath* 300 discards all incoming packets, and the terminal equipment discards all outgoing ones. The `CRC Length` options are:

16 bits Use 16-bit CRC (default).

32 bits Use 32-bit CRC.

5.18.8 Setting the Maximum Packet Length

Use the `Max Packet Length` field to specify the maximum length (in bytes) of a packet (frame) that this port can receive and reassemble. The options for packet size are:

1154 bytes
1538 bytes
2308 bytes
4616 bytes
9232 bytes (default) 16 reassemblies

NOTE The actual length of transmitted packets is determined by the transmitting device. This parameter only specifies the maximum-length packet that this port is able to reassemble.

Longer packets limit the number of simultaneous reassembly processes on the *CellPath* 300 since it has a finite amount of memory for packet reassembly. Since the length of a packet is determined by the transmitting device, it is usually safest to leave this parameter at its highest possible value, and only reduce it in an attempt to improve performance if it is known that the transmitting device does not send packets longer than the specified maximum packet length.

5.18.9 Setting Reassembly Time Out

Use the `Reassembly Time Out` field to specify the maximum time allowed (in milliseconds) for a packet to be reassembled from the ATM cell stream before the packet is considered lost or corrupted and thereby discarded.

If long packets (>4500 bytes) are being used and multiple packets are interleaved, set this parameter greater than 200 ms to avoid discarding otherwise good packets. Very long packets can easily exceed the 200 ms default limit for reassembly. The `Reassembly Time Out` options are:

200 ms (default)
500 ms
1000 ms

5.18.10 Specifying a Transmit Clock Source

Port Tx Clock specifies the source of the port's transmit clock.

When the transmit clock source is set to `System Clk`, the port uses the *CellPath* 300 system reference clock as its transmit clock. Use this setting when the *CellPath* 300 is to provide the timing reference for the network or terminal equipment attached to this port.

NOTE

For DSX-1 ports, data is always received using a clock signal recovered from the incoming data; the *CellPath* 300 does not clock data asynchronously.

When the transmit clock source is set to `Loop Rx`, the *CellPath* 300 derives a clock signal from the port's receive channel data stream, and uses the derived signal as the port's transmit clock. Use this option when the *CellPath* 300 timing source is not synchronized with the network or other equipment connected to this port. The `Port Tx Clock` options are:

System Clk — Use the *CellPath* 300 system reference clock as the port's transmit clock (default).

Loop Rx — Derive a clock signal from the port's receive channel data stream.

5.18.11 Selecting a Framing Format

Use the `Framing Format` field to specify the DSX-1 framing format used by the port. The port must be set to recognize and transmit data using the same framing format as the network or device it is connected to. The `Framing Format` options are:

ESF	Extended Super Frame (default)
SF(D4)	Super Frame (D4)

5.18.12 Setting the Line Coding

Use the `Line Coding` field to specify the line coding used by the port. The port must be set to the same line coding as the network or device it is connected to.

The `Line Coding` options are:

B8ZS	Binary 8 Zeroes Substitution (default)
AMI	Alternate Mark Inversion

5.18.13 Using Loopbacks

`Port Loopback` is used for testing only. To configure the *CellPath* 300 for normal operation, make sure this field is set to `None`. Refer to the *CellPath 300 Installation and Maintenance Manual* for more information about the `Port Loopback` field.

5.18.14 Channelized Data

This option allows setting the DSX-1 port for fractional service by enabling or blocking individual channels. When `Channelized Data` is set to `Disabled`, the entire bandwidth is available and individual channels are not supported.

The first field enables or disables fractional service. The three choices are:

Disabled	Disables the use of fractional DS1 service (default). All channels are used.
N x 64	When this option is selected, the DSX-1 port is capable of enabling or blocking any number of 64 Kbps channels within a 24-channel DS1 frame.
N x 56	When this option is selected, the DSX-1 port is capable of enabling or blocking any number of 56 Kbps channels within a 24-channel DS1 frame. (56K support is available only on DSX-1 ports on newer (Revision 3 or later) DSX-1 physical layer modules.)

The second field allows setting each channel to `Enabled (+)` or `Blocked (B)`. A + or a B is displayed below the corresponding channel number in the `Packet/DSX-1 Port Configuration` screen.

5.18.15 Exiting the Screen

The `[^Apply]` button applies any changes made in the screen, without exiting the screen. The keyboard equivalent is `<Ctrl-A>`.

The `[^OK]` button applies any changes made in the screen, then exits the screen. The keyboard equivalent is `<Ctrl-O>`.

The `[^Cancel]` button exits the screen without applying any changes made in the screen. The keyboard equivalent is `<Ctrl-C>`.

5.19 Configuring a Packet/E1 Port

The following pages describe how to configure a port that is transmitting or receiving packets over an E1 line. Fields that must be set to configure this port include `Port Name`, `Circuit Identifier`, `Port Alarm Mode`, `Packet Protocol`, `Header Length`, `CRC Length`, `Max Packet Length`, `Reassembly Time Out`, `Port Tx Clock`, `Framing Format`, and `Channelized Data`.

5.19.1 Accessing the Screen

Access a `Packet/E1 Port Configuration` screen from the port selection screen for a multi-port module attached to a packet or packet/CBR protocol module.

To access the `Port Selection` screen from the *CellPath* 300 `System Configuration` screen, scroll to a slot containing a multiport module (Quad E1 or Tri V.35/EIA-530 & E1) and press the <ENTER> key. Within the `Port Selection` screen, tab to the port to be configured and press the <ENTER> key.

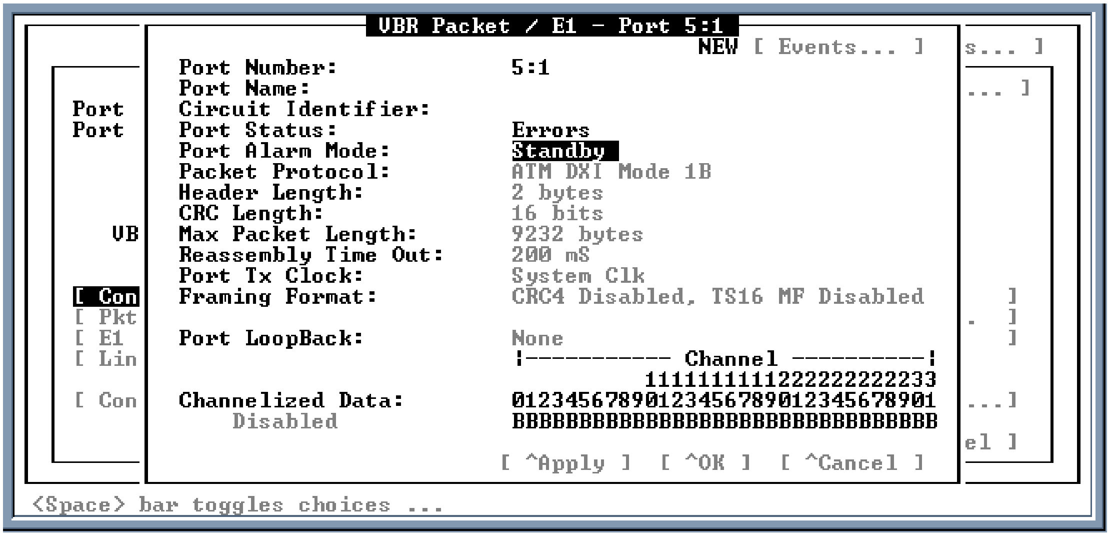


Figure 5.20 - Packet/E1 Configuration Screen

NOTE If the port has been configured to use Frame Relay UNI packet protocol, the `Port Selection` screen also includes a button that allows Frame Relay Link Management to be used to verify the integrity of the transmission lines.

NOTE If the E1 port is on a Tri V.35/EIA-530 & E1 module, it can be programmed for packet or constant bit rate traffic.

5.19.2 Setting the Port Name

The `Port Name` parameter is a text string up to 31 characters long that can be used to identify the port.

5.19.3 Specifying a Circuit Identifier

The `Circuit Identifier` parameter is a text string up to 255 characters long that uniquely identifies the circuit. This identifier is specified by the circuit vendor when setting up the circuit. The identifier should be recorded in this field, since it can be useful when communicating with the vendor during troubleshooting. Additional information, such as a description of what the circuit is connected to, can also appear in this field.

5.19.4 Setting the Port Alarm Mode

The `Port Alarm Mode` field allows turning alarm reporting on and off. During normal operation, alarm reporting should be on (`Active`), which logs each alarm into the `Event History Report` and can generate an SNMP trap. Turn alarm reporting off: (1) if the port is not in use; (2) during installation; or (3) when the port is expected to experience problems (i.e., during testing). The status of alarm reporting has no effect on data flowing through the port, or on connections terminating or originating at the port. The alarm reporting options are:

Active Turn on alarm reporting.

Standby Turn off alarm reporting (default).

Table 5.18 - Packet/E1 Port Alarm Mode

An Alarm at the Port	If Active	If Standby
Turns the IN and/or OUT port LEDs to red	Yes	Yes
Displays the word NEW next to the `Events` button at the top of every screen	Yes	No
Logs the alarm in the Event history Report	Yes	No
Generates an SNMP trap for the alarm (if traps are enabled)	Yes	No
Reported in the Port Status field on the configuration and statistics screens	Yes	Yes

5.19.5 Setting the Packet Protocol

Use the `Packet Protocol` field to configure the port for the protocol used by the device connected to the port. Match the selection to the service and protocol of the connecting device. The `Packet Protocol` options are:

ATM DXI Mode 1B For one or more AAL3/4 or AAL5 connections to equipment capable of generating and receiving ATM DXI or Frame Relay frames (default). (This is the only packet protocol that supports VPCs.)

Frame Relay UNI For one or more AAL5 connections to equipment capable of generating and receiving Frame Relay frames.

SMDS DXI For a single connection to equipment capable of generating and receiving SMDS DXI frames.

SMDS KCI For a single connection to equipment capable of generating and receiving SMDS KCI frames.

HDLC For a single connection to equipment capable of generating and receiving generic HDLC frames.

5.19.6 Setting the Header Length

The `Header Length` parameter specifies the number of bytes sent in the packet's header. Set this parameter to match the network or terminal equipment attached to the port.

This parameter only applies when `Packet Protocol` is set to `ATM DXI` or `FR UNI.` It has no effect otherwise. The `Header Length` options are:

2 bytes Send two-byte headers (default). Two-byte headers provides four bits in which to specify the VPI, and six bits in which to specify the VCI.

4 bytes Send four-byte headers. Four-byte headers provide the use up to 8 bits for VPI, and 16 bits for VCI, nine of which may be used with the *CellPath* 300. Four-byte headers allow the use of more DFAs, and thus more simultaneous connections.

5.19.7 Setting CRC Length

Use the `CRC Length` field to specify whether a 16-bit or 32-bit CRC is used for error-checking on incoming packets and encoding on outgoing packets.

Set this parameter to match the `CRC Length` used by the equipment connected to the port. Otherwise, the *CellPath* 300 discards all incoming packets, and the terminal equipment discards all outgoing ones. The `CRC Length` options are:

16 bits Use 16-bit CRC (default).

32 bits Use 32-bit CRC.

5.19.8 Setting the maximum Packet Length

Use the `Max Packet Length` field to specify the maximum length (in bytes) of a packet that this port can receive and reassemble. The options for packet size are:

1154 bytes
1538 bytes
2308 bytes
4616 bytes
9232 bytes (default) 16 reassemblies

NOTE The actual length of transmitted packets is determined by the transmitting device. This parameter only specifies the maximum-length packet that this port can accept.

Longer packets limit the number of simultaneous reassembly processes on the *CellPath* 300 since it has a finite amount of memory for packet reassembly. Since the length of a packet is determined by the transmitting device, it is usually safest to leave this parameter at its highest possible value, and only reduce it in an attempt to improve performance if it is known that the transmitting device does not send packets longer than the specified maximum packet length.

5.19.9 Setting Reassembly Time Out

Use the `Reassembly Time Out` field to specify the maximum time allowed (in milliseconds) for a packet to be reassembled from the ATM cell stream before the packet is considered lost or corrupted and thereby discarded.

If long packets (>4500 bytes) are being used and multiple packets are interleaved, set this parameter greater than 200 ms to avoid discarding otherwise good packets. Very long packets can easily exceed the 200 ms default limit for reassembly. The `Reassembly Time Out` options are:

200 ms (default)
500 ms
1000 ms

5.19.10 Specifying a Transmit Clock Source

`Port Tx Clock` specifies the source of the port's transmit clock.

When the transmit clock source is set to `System Clk`, the port uses the *CellPath* 300 system reference clock as its transmit clock. Use this setting when the *CellPath* 300 is to provide the timing reference for the network or terminal equipment attached to this port.

NOTE

For E1 ports, data is always received using a clock signal recovered from the incoming data; the *CellPath* 300 does not clock data asynchronously.

When the transmit clock source is set to `Loop Rx`, the *CellPath* 300 derives a clock signal from the port's receive channel data stream, and uses the derived signal as the port's transmit clock. Use this option when the *CellPath* 300 timing source is not synchronized with the network or other equipment connected to this port. The `Port Tx Clock` options are:

System Clk Use the *CellPath* 300 system reference clock as the port's transmit clock (default).

Loop Rx Derive a clock signal from the port's receive channel data stream.

5.19.11 Framing Format

This field provides selections for `CRC4 Error Checking` and `Time Slot 16 Multiframing`. Toggle through the five selections by pressing the space bar.

`CRC4 Error Checking` specifies whether or not the E1 port performs a CRC4 error check on all data received. `Time Slot 16 Multiframing` controls whether or not time slot 16 is reserved for signaling information. Set this option to match the network or terminal equipment connected to this port, or framing errors can result. The options are:

CRC4 Disabled, TS16 Multiframe Disabled	Disable CRC4 error checking; time slot 16 not used for framing (default).
CRC4 Enabled, TS16 Multiframe Disabled	Enable CRC4 error checking; time slot 16 not used for framing.
CRC4 Disabled, TS16 Multiframe Enabled	Disable CRC4 error checking; use time slot 16 for framing.
CRC4 Enabled, TS16 Multiframe Enabled	Enable CRC4 error checking; use time slot 16 for framing.
Unframed	Set this option to match the network or terminal equipment connected to this port.

5.19.12 Using Loopbacks

`Port Loopback` is used for testing only. To configure this port for normal operation, make sure this field is set to `None`. Refer to *CellPath 300 Installation and Maintenance Manual* for more information about the `Port Loopback` field.

5.19.13 Channelized Data

This option allows the E1 port to be set for fractional service by enabling or blocking individual channels. When channelized data is set to `Disabled`, the entire bandwidth is available and individual channels are not supported. The first field allows enabling or disabling of fractional service. The two choices are:

Disabled	Disables the use of fractional E1 service (default). All channels are used.
N x 64	When this option is selected, the E1 port is capable of enabling or blocking any number of 64 Kbps channels within a 32-channel E1 frame.

The second field allows setting each channel to Enabled (+) or Blocked (B). A + or a B is displayed below the corresponding channel number in the Packet/E1 Port Configuration screen.

For unframed E1, individual channels are not supported.

For framed E1, time slot 0 is always disabled (blocked). Time slot 16 can be enabled or blocked depending on the setting of the framing format (see above). If the setting of TS16 Multiframe is disabled, time slot 16 can be enabled or blocked, but if TS16 Multiframe is enabled, time slot 16 is always blocked.

5.19.14 Exiting the Screen

The [^Apply] button applies any changes made in the screen, without exiting the screen. The keyboard equivalent is <Ctrl-A>.

The [^OK] button applies any changes made in the screen, then exits the screen. The keyboard equivalent is <Ctrl-O>.

The [^Cancel] button exits the screen without applying any changes made in the screen. The keyboard equivalent is <Ctrl-C>.

5.20 Configuring a Packet (10203/10205)/V.35/EIA-530 Port

The following pages describe how to configure a port that is transmitting or receiving packets over a V.35/EIA-530 line. Fields that must be set to configure this port include `Port Name`, `Port Alarm Mode`, `Packet Protocol`, `Header Length`, `CRC Length`, `Max Packet Length`, `Reassembly Time Out`, `Clock Source`, `Port Mode`, `Port Clock Rate`, `Flow Control`, and `LOS Detect`.

5.20.1 Accessing the Screen

Access a `Packet/V.35 Port Configuration` screen from the port selection screen for a multiport module attached to a packet or packet/CBR protocol module.

To access the port selection screen from the *CellPath* 300 `System Configuration` screen, scroll to a slot containing a multiport module (Quad V.35/EIA-530, or a Tri V.35/EIA-530 & DSX-1 or E1) and press the <ENTER> key. Within the port selection screen, tab to the port to be configured and press the <ENTER> key.

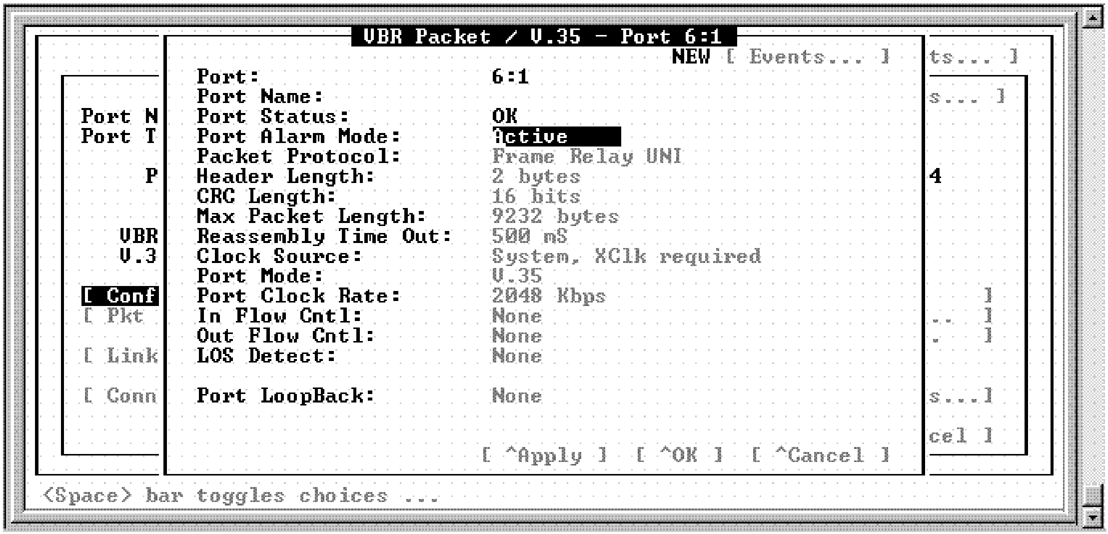


Figure 5.21 - Packet (10203/10205)/V.35/EIA-530 Configuration Screen

NOTE

If the port has been configured to use Frame Relay UNI packet protocol, the port selection screen also includes a button that allows the use of Frame Relay Link Management to verify the integrity of the transmission lines.

NOTE

Data may pass with intermittent errors when two V.35/EIA-530 devices are not configured to identical electrical interface settings. Always verify that the devices are configured properly when they are unable to pass data 100% of the time.

NOTE

If the V.35/EIA-530 port is port 3 on a Tri V.35/ EIA-530 & DSX-1 or E1 module, it can be programmed for packet or constant bit rate traffic.

5.20.2 Setting the Port Name

The `Port Name` parameter is a text string up to 31 characters long that can be used to identify the port.

5.20.3 Setting the Port Alarm Mode

The `Port Alarm Mode` field allows turning alarm reporting on and off. During normal operation, alarm reporting should be on (`Active`), which logs each alarm into the `Event History Report` and can generate an SNMP trap. Turn alarm reporting off: (1) if the port is not in use; (2) during installation; or (3) when the port is expected to experience problems (i.e., during testing). The status of alarm reporting has no effect on data flowing through the port, or on connections terminating or originating at the port. The alarm reporting options are:

Active Turn on alarm reporting.

Standby Turn off alarm reporting (default).

Table 5.19 - Packet V.35/EIA-530 Port Alarm Mode

An Alarm at the Port	If Active	If Standby
Turns the IN and/or OUT port LEDs to red	Yes	Yes
Displays the word NEW next to the `Events` button at the top of every screen	Yes	No
Logs the alarm in the `Event History Report`	Yes	No
Generates an SNMP trap for the alarm (if traps are enabled)	Yes	No
Reported in the `Port Status` field on the configuration and statistics screens	Yes	Yes

5.20.4 Setting the Packet Protocol

Use the `Packet Protocol` field to configure the port for the protocol used by the device connected to the port. Match the selection to the service and protocol of the connecting device. The `Packet Protocol` options are:

ATM DXI Mode 1B For one or more AAL3/4 or AAL5 connections to equipment capable of generating and receiving ATM DXI or Frame Relay frames (default). (This is the only packet protocol that supports VPCs.)

Frame Relay UNI For one or more AAL5 connections to equipment capable of generating and receiving Frame Relay frames.

SMDS DXI Not supported on the *CellPath* 300.

SMDS KCI Not supported on the *CellPath* 300.

HDLC For a single connection to equipment capable of generating and receiving generic HDLC frames.

5.20.5 Setting the Header Length

The `Header Length` parameter specifies the number of bytes sent in the packet's header. Set this parameter to match the network or terminal equipment attached to the port.

This parameter only applies when `Packet Protocol` is set to `ATM DXI` or `Frame Relay UNI`. It has no effect otherwise. The `Header Length` options are:

2 bytes Send two-byte headers (default). Two-byte headers provide four bits in which to specify the VPI, and six bits in which to specify the VCI.

4 bytes Send four-byte headers. Four-byte headers let provide up to 8 bits for VPI, and 16 bits for VCI, nine of which may be used with the *CellPath* 300. Four-byte headers allow the use of more DFAs, and thus more simultaneous connections.

5.20.6 Setting CRC Length

Use the `CRC Length` field to specify whether a 16-bit or 32-bit CRC is used for error-checking on incoming packets and encoding on outgoing packets.

Set this parameter to match the CRC length used by the equipment connected to the port. Otherwise, the *CellPath* 300 discards all incoming packets, and the terminal equipment discards all outgoing ones. The `CRC Length` options are:

16 bits Use 16-bit CRC (default).

32 bits Use 32-bit CRC.

5.20.7 Setting the Maximum Packet Length

Use the `Max Packet Length` field to specify the maximum length (in bytes) of a packet that this port can receive and reassemble. The options for packet size are:

1154 bytes
1538 bytes
2308 bytes
4616 bytes
9232 bytes (default) 16 reassemblies

NOTE The actual length of transmitted packets is determined by the transmitting device. This parameter only specifies the maximum-length packet that this port can accept.

Longer packets limit the number of simultaneous reassembly processes on the *CellPath* 300 since it has a finite amount of memory for packet reassembly. Since the length of a packet is determined by the transmitting device, it is usually safest to leave this parameter at its highest possible value, and only reduce it in an attempt to improve performance if it is known that the transmitting device does not send packets longer than the specified maximum packet length.

5.20.8 Setting Reassembly Time Out

Use the `Reassembly Time Out` field to specify the maximum time allowed (in milliseconds) for a packet to be reassembled from the ATM cell stream before the packet is considered lost or corrupted and thereby discarded.

If long packets (>4500 bytes) are being used and have multiple packets are interleaved, set this parameter greater than 200 ms to avoid discarding otherwise good packets. Very long packets can easily exceed the 200 ms default limit for reassembly. Keep in mind that large packets with low clocks may time out at reassembly. The `Reassembly Time Out` options are:

200 ms (default)
500 ms
1000 ms

5.20.9 Specifying Clock Sources

The `Clock Source` parameter specifies the source of the port's clocking signals.

5.20.9.1 System Clock When an External Clock is Required

When the `Clock Source` is set to `System, XClk required`, the port uses the *CellPath* 300 system reference clock as the source for the outgoing clock signals. Incoming data is clocked with the interface's external clock signal. Use this setting when the *CellPath* 300 is to provide the timing reference for the network or terminal equipment attached to this port.

5.20.9.2 System Clock When an External Clock is Not Available

When the `Clock Source` is set to `System, No XClk required`, the port uses the *CellPath* 300 system reference clock as the source for the outgoing clock signals. In this case, incoming data is also clocked with the *CellPath* 300 system reference clock. Use this setting when the *CellPath* 300 is to provide the timing reference for the network or terminal equipment attached to this port, but the equipment does not supply a synchronized external clock.

5.20.9.3 Looping the External Clock Signal

When the `Clock Source` is set to `Loop XClk`, the *CellPath* 300 uses the port's external clock signal as the source of the port's Rx clk signal and Tx clk signal. Use this option when the *CellPath* 300 timing source is not synchronized with the network or other equipment connected to this port.

The `Clock Source` options are:

System, XClk required — Use the *CellPath* 300 system reference clock as the source of the port's Rx clk signal and Tx clk signal (default).

System, No XClk required Use the *CellPath* 300 system reference clock as the source of the port's Rx clk signal and Tx clk signal. Incoming data is also clocked with the *CellPath* 300 system reference clock.

Loop XClk Use the port's Ext clk signal as the source of the port's Rx clk signal and Tx clk signal.

5.20.10 Setting the Clock Rate

`Port Clock Rate` specifies the bit rate of the port in Kbps. Allowable values are integers from `56` to `2048`, in multiples of `56` or `64`. The default is `128` Kbps. Set this parameter to match the rate of the attached equipment.

NOTE 56K clock rates are supported on the Quad V.35/EIA-530 physical layer module and on Revision 3 or later Tri V.35/EIA-530 & DSX-1 and Tri V.35/EIA-530 & E1 physical layer modules.

5.20.11 Setting the Port Mode

`Port Mode` specifies whether the port is to be a V.35 or EIA-530 port. The `Port Mode` options are:

V.35 Use with V.35 ports (default).

EIA-530 Use with EIA-530, RS449, and X.21 ports.

NOTE An adapter cable may be required to make the connection to this port. See the *CellPath 300 ATM WAN Multiplexer User's Manual* for information about cabling. Cables are available for purchase from FORE Systems, Inc; see your FORE Systems representative for more information.

5.20.12 Setting Up Flow Control

The `In Flow Control` parameter determines how the port tells attached equipment to temporarily halt transmission, in order to avoid data overflows. Set this parameter to work with the setting of the attached equipment.

When the *CellPath* 300 receive buffer is nearly full (i.e., an overflow condition is impending), the setting of the `In Flow Control` parameter determines what action the *CellPath* 300 takes. The `In Flow Control` options are:

None	Take no action on impending overflow; overflow may occur (default).
Gapped Clk	Halt transmit (TSET_DCE) clock on impending overflow.
DCD	De-assert DCD on impending overflow.
CTS	De-assert CTS on impending overflow.
DCD and CTS	De-assert DCD and CTS on impending overflow.

The `Out Flow Control` parameter determines how the port senses when attached equipment is telling it to halt transmission, in order to avoid overflowing the equipment's receive buffer. Set this parameter to work with the setting of the attached equipment.

The `Out Flow Control` options are:

None	No signal halts transmission; overflow may occur (default).
DTR	Halt transmission when attached equipment de-asserts DTR.
RTS	Halt transmission when attached equipment de-asserts RTS.
DTR or RTS	Halt transmission when DTR or RTS is de-asserted.
DTR and RTS	Halt transmission when both DTR and RTS are de-asserted.

5.20.13 Setting the LOS Alarm Detection

The `LOS Detect` parameter specifies which signals (if any) are used to detect when a `Loss of Signal` condition `(LOS)` exists. The `LOS Detect` options are:

None	Alarms are never triggered upon LOS (default).
DTR	Trigger alarm when DTR is de-asserted.
RTS	Trigger alarm when RTS is de-asserted.
DTR or RTS	Trigger alarm when DTR or RTS is de-asserted.
DTR and RTS	Trigger alarm when both DTR and RTS are de-asserted.

5.20.14 In Clock Polarity

Use this option when experiencing problems with errored data. Inverting the clock changes the effective timing relationship between the clock and the data and may correct for a skew caused by transmission delay through a cable. The options are:

Normal The in clock is not inverted (default).

Inverted Inverts the receive clock.

NOTE

The `In Clock Polarity` option is available with the Quad V.35/EIA-530 physical layer module and with Revision 3 or later Tri V.35/EIA-530 & DSX-1 and Tri V.35/EIA-530 & E1 physical layer modules.

5.20.15 Using loopbacks

`Port Loopback` is used for testing only. To configure this port for normal operation, make sure this field is set to None. Refer to the *CellPath 300 Installation and Maintenance Manual* for more information about the `Port Loopback` field.

5.20.16 Exiting the Screen

The `[^Apply]` button applies any changes made in the screen, without exiting the screen. The keyboard equivalent is `<Ctrl-A>`.

The `[^OK]` button applies any changes made in the screen, then exits the screen. The keyboard equivalent is `<Ctrl-O>`.

The `[^Cancel]` button exits the screen without applying any changes made in the screen. The keyboard equivalent is `<Ctrl-C>`.

5.21 Configuring a CBR/DSX-1 Port

The following pages describe how to configure a port that is transmitting or receiving CBR data over a DSX-1 line. Fields that must be set to configure this port include `Port Name`, `Port Alarm Mode`, `Max CBR Buffer Depth`, `Port Tx Clock`, `Framing Format`, and `Line Coding`. Ensure that `Port Loopback` is set to `None`.

5.21.1 Accessing the Screen

The `CBR/DSX-1 Port Configuration` screen (Figure 5.22) is accessed from the `Port Selection` screen for a multiport module attached to a packet / CBR PM.

To access the `Port Selection` screen from the *CellPath* 300 `System Configuration` screen, scroll to a slot containing a multiport module (Quad DSX-1 or Tri V.35 / EIA-530 & DSX-1) and press the <ENTER> key. Within the port selection screen, scroll to the port to be configured and press the <ENTER> key.

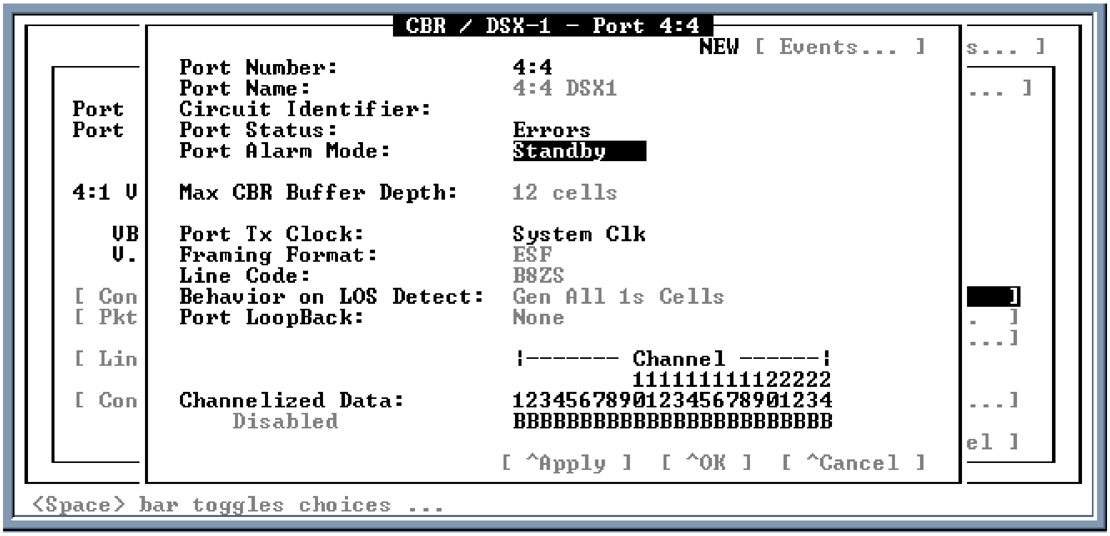


Figure 5.22 - CBR / DSX-1 Port Configuration Screen

NOTE

If the DSX-1 port is on a Tri V.35 / EIA-530 & DSX-1 module, it can be programmed for packet or CBR traffic. See Section 5.1.2 for instructions about how to do this.

5.21.2 Setting the Port Name

The `Port Name` parameter is a text string up to 31 characters long that is used to identify the port.

5.21.3 Specifying a Circuit Identifier

The `Circuit Identifier` parameter is a text string up to 255 characters long that uniquely identifies the circuit. This identifier is specified by the circuit vendor when setting up the circuit. The identifier should be recorded in this field, since it can be useful when communicating with the vendor during troubleshooting. Additional information such as a description of what the circuit is connected to can also appear in this field.

5.21.4 Setting the Port Alarm Mode

The `Port Alarm Mode` field allows turning alarm reporting on and off. During normal operation, alarm reporting should be on (`Active`), which logs each alarm into the `Event History Report` and can generate an SNMP trap. Turn alarm reporting off: (1) if the port is not in use; (2) during installation; or (3) when the port is expected to experience problems (i.e., during testing). The status of alarm reporting has no effect on data flowing through the port, or on connections terminating or originating at the port. The alarm reporting options are:

Active Turn on alarm reporting.

Standby Turn off alarm reporting (default).

Table 5.20 - CBR/DSX-1 Port Alarm Mode

An Alarm at the Port	If Active	If Standby
Turns the IN and/or OUT port LEDs to red	Yes	Yes
Displays the word NEW next to the `Events` button at the top of every screen	Yes	No
Logs the alarm in the `Event History Report`	Yes	No
Generates an SNMP trap for the alarm (if traps are enabled)	Yes	No
Reported in the `Port Status` field on the configuration and statistics screens	Yes	Yes

5.21.5 Setting Maximum CBR Buffer Depth

`Max CBR Buffer Depth` specifies the maximum number of cells allowed in the port output buffer before the *CellPath* 300 begins discarding cells. Allowable values are `12, 15, 18,` and `21`. The default is `12`.

If a continuous stream of overflows is being experienced, a configuration error is present causing too many cells to be sent to this port. Check the far-end source of cells to be sure that both ends of the connections are set to the same data rate. Otherwise, check the ATM network behavior, particularly cell delay variation (CDV) (clumping) and clock tolerance.

The *CellPath* 300 automatically maintains a minimum of six cells of latency (~1.5 ms at DSX-1 rates) to account for the normal CDV introduced by typical ATM networks.

5.21.6 Specifying a Transmit Clock Source

`Port Tx Clock` specifies the source of the port's transmit clock. The only allowable value for a CBR port running on a DSX-1 line is `System Clk`, using the *CellPath* 300 system reference clock as the port's transmit clock. Therefore, `Port Tx Clock` is a read-only field for CBR/DSX-1 ports.

NOTE

Any Data Terminal Equipment attached to a CBR/DSX-1 port must use one of the following options:
1. be timed off this port;
2. be set up so that the *CellPath* 300 system reference clock is timed off it; or
3. incorporate a receive-side slip buffer to handle transmission-rate mismatches.

5.21.7 Selecting a Framing Format

Set the DSX-1 `Framing Format` to match the service provided by the carrier or T1 terminal equipment. A value of `ESF` stands for Extended Super Frame; this value is the default. A value of `SF(D4)` is used for D4 lines only. The `Framing Format` options are:

ESF	Extended Super Frame (default)
SF(D4)	Super Frame (D4)

5.21.8 Setting the Line Coding

`Line Coding` specifies the DS-1 line encoding. Set this parameter to match the service provided by the carrier or T1 terminal equipment. The `Line Coding` options are:

B8ZS Binary 8 Zeroes Substitution (default)

AMI Alternate Mark Inversion

5.21.9 Behavior on LOS

This field enables the selection of the type of response received when the port detects a loss of signal. The options are:

Gen All 1s Cell This selection sends an alarm indication signal (an all-ones signal) in response to a loss of signal (default).

Gen No Cells This selection allows the bandwidth to be preserved by preventing the transmission of any cells. An under flow occurs at the far end CBR port FIFO and the far end CBR port FIFO transmits all 1s to the far end terminal device.

5.21.10 Using Loopbacks

`Port Loopback` is used for testing only. To configure this port for normal operation, make sure this field is set to `None`. Refer to the *CellPath 300 Installation and Maintenance Manual* for more information on `Port Loopbacks`.

5.21.11 Channelized Data

This option allows setting the DSX-1 port for fractional service by enabling or blocking individual channels. When channelized data is set to `Disabled`, the entire bandwidth is available and individual channels are not supported. The first field allows the fractional service to be enabled or disabled. The choices are:

Disabled Disables the use of fractional DS1 service (default). All channels are used.

N x 64 When this option is selected, the DSX1 port is capable of enabling or blocking any number of 64 kbps channels within a 24-channel DS1 frame.

N x 56 When this option is selected, the DSX-1 port is capable of enabling or blocking any number of 56 kbps channels with a 24-channel DS1 frame. (56K support is available only on DSX-1 ports with newer (Revision 3 or later) DSX-1 physical layer modules.)

The second field allows setting of each channel to `Enabled (+)` or `Blocked (B)`. A `+` or a `B` is displayed below the corresponding channel number in the `Packet/DSX-1 Port Configuration` screen.

NOTE

The *CellPath* 300 uses a quasi-structured AAL-1 data transfer method that supports limited fractional service. There is only one group of T1 time slots, no end-to-end T1 time slots matching, and it is primarily for V.35 CBR and DSX-1 CBR interworking. The *CellPath* 300 does not support AAL1 Structured Data Transfer (SDT).

5.21.12 Exiting the Screen

The `[^Apply]` button applies any changes made in this screen, without exiting the screen. The keyboard equivalent is <`Ctrl-A`>.

The `[^OK]` button applies any changes made in this screen, then exits the screen. The keyboard equivalent is <`Ctrl-O`>.

The `[^Cancel]` button exits the screen without applying any changes made in the screen. The keyboard equivalent is <`Ctrl-C`>.

5.22 Configuring a CBR/E1 Port

The following pages describe how to configure a port that is transmitting or receiving data at a CBR over an E1 line. Fields that must be set to configure this port include `Port Name`, `Port Alarm Mode`, `Max CBR Buffer Depth`, `Framing Format`, and `CRC4 Error Check`. Ensure that `Port Loopback` is set to `None`.

5.22.1 Accessing the Screen

The `CBR/E1 Port Configuration` screen (Figure 5.23) is accessed from the `Port Selection` screen for a multiport module attached to a packet/CBR protocol module.

To access the `Port Selection` screen from the *CellPath* 300 `System Configuration` screen, scroll to a slot containing a multiport module (Quad E1 or Tri V.35/EIA-530 & E1) and press the <ENTER> key. Within the `Port Selection` screen, scroll to the port to be configured and press the <ENTER> key.

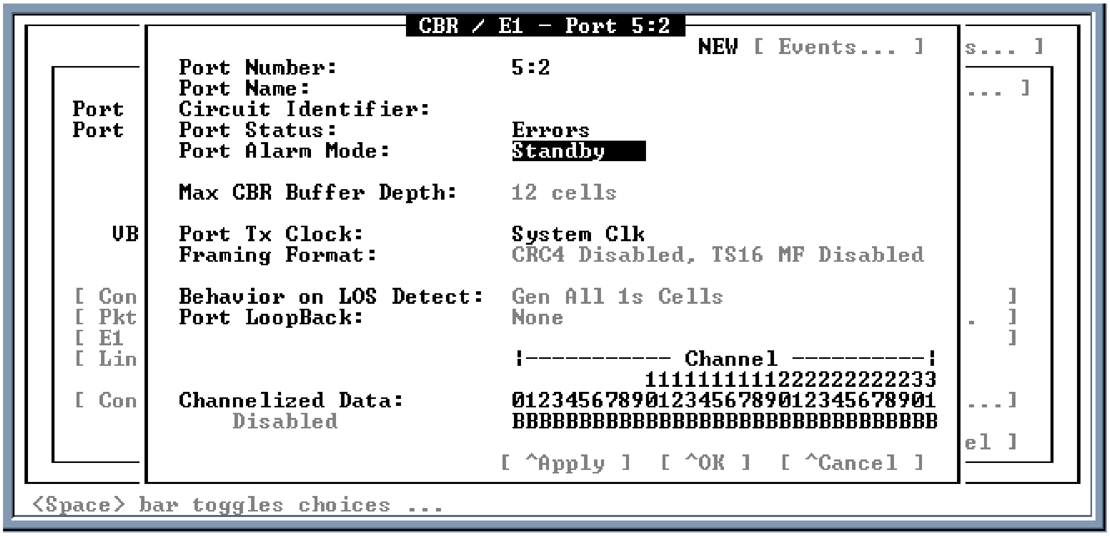


Figure 5.23 - CBR/E1 Port Configuration Screen

NOTE

If the E1 port is on a Tri V.35/EIA-530 & E1 module, it can be programmed for packet or CBR traffic. See Section 5.1.2 for instructions about how to do this.

5.22.2 Setting the Port Name

The `Port Name` parameter is a text string up to 31 characters long that is used to identify the port.

5.22.3 Specifying a Circuit Identifier

The `Circuit Identifier` parameter is a text string up to 255 characters long that uniquely identifies the circuit. This identifier is specified by the circuit vendor when setting up the circuit. The identifier should be recorded in this field, since it can be useful when communicating with the vendor during troubleshooting. Additional information such as a description of what the circuit is connected to can also appear in this field.

5.22.4 Setting the Port Alarm Mode

The `Port Alarm Mode` field allows turning alarm reporting on and off. During normal operation, alarm reporting should be on `(Active)`, which logs each alarm into the `Event History Report` and can generate an SNMP trap. Turn alarm reporting off: (1) if the port is not in use; (2) during installation; or (3) when the port is expected to experience problems (i.e., during testing). The status of alarm reporting has no effect on data flowing through the port, or on connections terminating or originating at the port. The alarm reporting options are:

Active Turn on alarm reporting.

Standby Turn off alarm reporting (default).

Table 5.21 - CBR/E1 Port Alarm Mode

An Alarm at the Port	If Active	If Standby
Turns the IN and/or OUT port LEDs to red	Yes	Yes
Displays the word NEW next to the `Events` button at the top of every screen	Yes	No
Logs the alarm in the `Event History Report`	Yes	No
Generates an SNMP trap for the alarm (if traps are enabled)	Yes	No
Reported in the `Port Status` field on the configuration and statistics screens	Yes	Yes

5.22.5 Setting Maximum CBR Buffer Depth

Max CBR Buffer Depth specifies the maximum number of cells allowed in the port output buffer before the *CellPath* 300 begins discarding cells. Allowable values are positive integers from 12 to 21, inclusive. The default is 12.

If a continuous stream of overflows is experienced, a configuration error is present causing too many cells to be sent to this port. Check the far-end source of cells to be sure that both ends of the connections are set to the same data rate. Otherwise, check the ATM network behavior, particularly CDV (clumping) and clock tolerance.

The *CellPath* 300 automatically maintains a minimum of six cells of latency (~1 ms at E-1 rates) to account for the normal CDV introduced by typical ATM networks.

5.22.6 Specifying a Transmit Clock Source

Port Tx Clock specifies the source of the port's transmit clock. The only allowable value for a CBR port running on an E1 line is System Clk, using the *CellPath* 300 system reference clock as the port's transmit clock. Therefore, Port Tx Clock is a read-only field for CBR/E1 ports.

NOTE

Any Data Terminal Equipment attached to a CBR/E1 port must use one of the following options:

1. be timed off this port;
2. be set up so that the *CellPath* 300 system reference clock is timed off it; or
3. incorporate a receive-side slip buffer to handle transmission-rate mismatches.

5.22.7 Framing Format

This field provides selection for CRC4 Error Checking and Time Slot 16 Multiframing. Toggle through the four available selections by pressing the space bar.

CRC4 Error Checking specifies whether or not the E1 port performs a CRC4 error check on all data received. Time Slot 16 Multiframe controls whether or not time slot 16 is reserved for signalling information. Set this option to match the network or terminal equipment connected to this port, or framing errors result. The available options are:

CRC4 Disabled, TS16 Multiframe Disabled Disable CRC4 error checking; use time slot 16 as another data channel (default).

CRC4 Enabled, TS16 Multiframe Disabled — Enable CRC4 error checking; use time slot 16 as another data channel.

CRC4 Disabled, TS16 Multiframe Enabled — Disable CRC4 error checking; reserve time slot 16 for signalling information.

CRC4 Enabled, TS16 Multiframe Enabled — Enable CRC4 error checking; reserve time slot 16 for signalling information.

5.22.8 Setting Behavior on LOS

This field enables the selection of the type of response received when the port detects a loss of signal. The options are:

Gen All 1s Cell — This selection sends an alarm indication signal (an all-ones signal) in response to a loss of signal (default).

Gen No Cells — This selection allows the bandwidth to be preserved by preventing the transmission of any cells. An under flow occurs at the far end CBR port FIFO and the far end CBR port FIFO transmits all 1s to the far end terminal device.

5.22.9 Using Loopbacks

`Port Loopback` is used for testing only. To configure this port for normal operation, make sure this field is set to `None`. Refer to *CellPath 300 Installation and Maintenance Manual* for more information about the `Port Loopback` field.

5.22.10 Channelized Data

This option allows setting the E1 port for fractional service by enabling or blocking individual channels. When `Channelized Data` is set to `Disabled`, the entire bandwidth is available and individual channels are not supported. The first field allows the fractional service to be enabled or disabled. The choices are:

Disabled — Disables the use of fractional E1 service (default). All channels are used.

N x 64 — When this option is selected, the E1 port is capable of enabling or blocking any number of 64 kbps channels within a 32-channel E1 frame.

The second field allows setting of each channel to `Enabled (+)` or `Blocked (B)`. A `+` or a `B` is displayed below the corresponding channel number in the `Packet/E1 Port Configuration` screen.

For unframed E1, individual channels are not supported.

For framed E1, Time Slot 0 is always disabled (blocked). Time slot 16 can be enabled or blocked depending on the setting of the framing format (see above). If the setting of TS16 Multiframe is disabled, Time Slot 16 can be enabled or blocked, but if TS16 Multiframe is enabled, Time slot 16 is not configurable.

NOTE

The *CellPath* 300 uses a quasi-structured AAL1 data transfer method that supports limited fractional service. There is only one group of E1 time slots, no end-to-end E1 time slots matching, and it is primarily for V.35 CBR and E1 CBR interworking. The *CellPath* 300 does not support AAL1 Structured Data Transfer (SDT).

5.22.11 Exiting the Screen

The `[^Apply]` button applies any changes made in the screen, without exiting the screen. The keyboard equivalent is `<Ctrl-A>`.

The `[^OK]` button applies any changes made in the screen, then exits the screen. The keyboard equivalent is `<Ctrl-O>`.

The `[^Cancel]` button exits the screen without applying any changes made in the screen. The keyboard equivalent is `<Ctrl-C>`.

5.23 Configuring a CBR/V.35/EIA-530 Port

The following pages describe how to configure a port transmitting or receiving CBR data over a V.35 or EIA-530 line. Fields that must be set to configure this port include `Port Name`, `Port Alarm Mode`, `Max CBR Buffer Depth`, `Port Tx Clock`, `Port Clock Rate`, `Port Mode`, and `LOS Alarm Detect`. Ensure that `Port Loopback` is set to `None`.

5.23.1 Accessing the Screen

The `CBR/V.35 Port Configuration` screen (Figure 5.24) is accessed from the `Port Selection` screen for a multiport module attached to a packet/CBR PM. From the *CellPath* 300 `System Configuration` screen, scroll to a slot containing a multiport module (Tri V.35/EIA-530 & DSX-1 or E1), and press `<ENTER>`. Scroll to the port to be configured, and press the `<ENTER>` key.

NOTE

Data may pass with intermittent errors when two V.35/EIA-530 devices are not configured identically. Always verify that the devices are configured properly when they are unable to pass data 100% of the time.

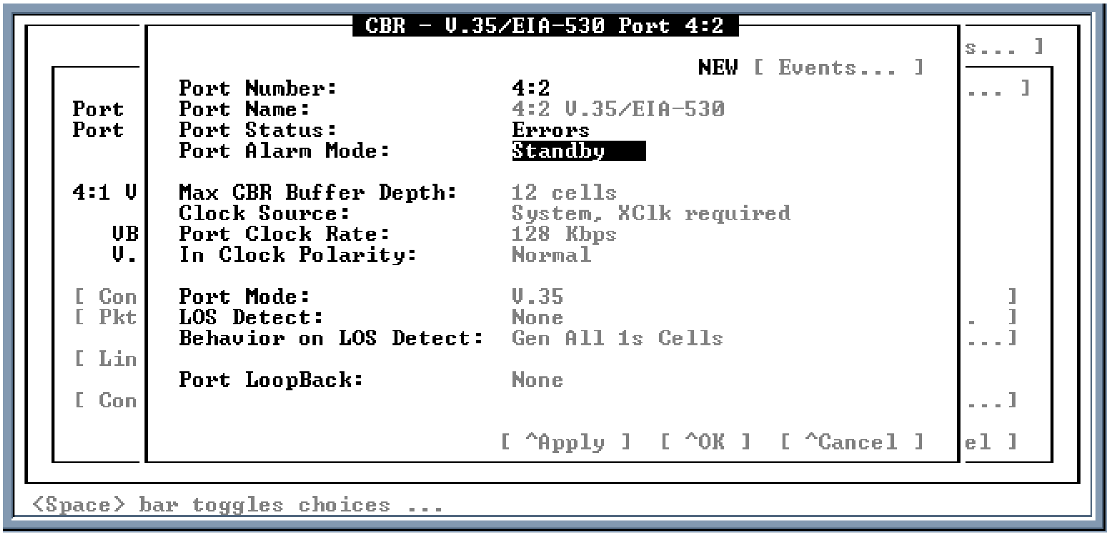


Figure 5.24 - CBR/V.35 Port Configuration Screen

NOTE If the V.35 port is port 3 on a Tri V.35 / EIA-530 & DSX-1 or E1 module, it can be programmed for packet or CBR traffic. See Section 5.1.2 for instructions about how to do this.

5.23.2 Setting the Port Name

The `Port Name` parameter is a text string up to 31 characters long that is used to identify the port.

5.23.3 Setting the Port Alarm Mode

The `Port Alarm Mode` field allows turning alarm reporting on and off. During normal operation, alarm reporting should be on (`Active`), which logs each alarm into the `Event History Report` and can generate an SNMP trap. Turn alarm reporting off: (1) if the port is not in use; (2) during installation; or (3) when the port is expected to experience problems (i.e., during testing). The status of alarm reporting has no effect on data flowing through the port, or on connections terminating or originating at the port. The alarm reporting options are:

Active Turn on alarm reporting.

Standby Turn off alarm reporting (default).

Table 5.22 - CBR / V.35 Port Alarm Mode

An Alarm at the Port	If Active	If Standby
Turns the IN and / or OUT port LEDs to red	Yes	Yes
Displays the word NEW next to the `Events` button at the top of every screen	Yes	No
Logs the alarm in the `Event History Report`	Yes	No
Generates an SNMP trap for the alarm (if traps are enabled)	Yes	No
Reported in the `Port Status` field on the configuration and statistics screens	Yes	Yes

5.23.4 Specifying CBR Buffer Depth

`Max CBR Buffer Depth` specifies the maximum number of cells allowed in the port output buffer before the *CellPath* 300 begins discarding cells. Allowable values are `12, 15, 18,` and `21`. The default is `12`.

If a continuous stream of overflows is experienced, a configuration error is present causing too many cells to be sent to this port. Check the far-end source of cells to be sure that both ends of the connections are set to the same data rate. Otherwise, check the ATM network behavior, particularly CDV (clumping) and clock tolerance.

The *CellPath* 300 automatically maintains a minimum of six cells of latency to account for the normal CDV introduced by typical ATM networks.

5.23.5 Specifying a Transmit Clock Source

The `Clock Source` parameter specifies the source of the port's clocking signals.

When the `Clock Source` is set to `System, XClk required`, the port uses the *CellPath* 300 system reference clock as the source for the outgoing clock signals. Incoming data is clocked with the interface's external clock source. Use this setting when the *CellPath* 300 is to provide the timing reference for the network or terminal equipment attached to this port.

When the `Clock Source` is set to `System, No XClk required,` the port uses the *CellPath* 300 system reference clock as the source for the outgoing clock signals. In this case, incoming data is also clocked with the *CellPath* 300 system reference clock. Use this setting when the *CellPath* 300 is to provide the timing reference for the network or terminal equipment attached to this port, but the equipment does not supply a synchronized external clock.

When the `Clock Source` is set to `Loop XClk`, the *CellPath* 300 uses the port's external clock signal as the source of the port's Rx clk signal and Tx clk signal. Use this option when the *CellPath* 300 timing source is not synchronized with the network or other equipment connected to this port. The `Clock Source` options are:

System, XClk required Use the *CellPath* 300 system reference clock as the source of the port's Rx clk signal and Tx clk signal (default).

System, No XClk required Use the *CellPath* 300 system reference clock as the source of the port's Rx clk signal and Tx clk signal. Incoming data is also clocked with the *CellPath* 300 system reference clock. (This option is available on Revision 3 or later Tri V.35/EIA-530 & DSX-1 and Tri V.35/EIA-530 & E1 physical layer modules.)

Loop XClk Use the port's Ext clk signal as the source of port's Rx clk signal and Tx clk signal.

When a CBR/V.35 port is used as the source for the system reference clock, this parameter should be set to `System Clk`.

5.23.6 Setting the Port Clock Rate

`Port Clk Rate` specifies the bit rate of the port in kilobytes per second. Allowable values are integers from `64` to `2048`, in multiples of `64`. The default is `128`. Set this parameter to match the rate of the attached equipment.

NOTE 56k clock rates are supported on the Quad V.35/EIA-530 physical layer module and on Revision 3 or later Tri V.35/EIA-530 & DSX-1 and Tri V.35/EIA-530 & E1 physical layer modules.

5.23.7 In Clock Polarity

Use this option when experiencing problems with errored data. Inverting the clock changes the effective timing relationship between the clock and the data and may correct for a skew caused by transmission delay through a cable.

NOTE The `In Clock Polarity` option is available with the Quad V.35/EIA-530 physical layer module and with Revision 3 or later Tri V.35/EIA-530 & DSX-1 and Tri V.35/EIA-530 & E1 physical layer modules.

The options are:

Normal The inclock is not inverted (default).

Inverted Inverts the receive clock.

5.23.8 Setting the Port Mode

`Port Mode` specifies whether the port is to be a V.35 or EIA-530 port. The `Port Mode` options are:

V.35 Use with V.35 ports (default).

EIA-530 Use with EIA-530, RS449, and X.21 ports.

CAUTION

Leaving unterminated cables attached to an EIA-530 CBR port can cause the clock signals to ring and clock the input port at a rate higher than intended. This can interfere with data transmission through other CBR ports in the same slot. Always make sure that cables are terminated properly or remove them from the port connector.

NOTE

An adapter cable may be required to make the connection to this port.

5.23.9 Setting LOS Detection

The `LOS Detect` parameter specifies which signals (if any) are used to detect when a `Loss of Signal condition (LOS)` exists. When a `Loss of Signal` condition is detected, the *CellPath* 300 port stops sending cells into the network.

The `LOS Detect` options are:

None Alarms are never triggered (default) on LOS.

DTR Trigger alarm when DTR is de-asserted.

RTS Trigger alarm when RTS is de-asserted.

DTR or RTS Trigger alarm when DTR or RTS is de-asserted.

DTR and RTS Trigger alarm when DTR and RTS are de-asserted.

5.23.10 Behavior on LOS Detection

This field enables the selection of the type of response received when the port detects a loss of signal. The options are:

Gen All 1s Cells This selection sends an alarm indication signal (an all-ones signal) in response to a loss of signal (default).

Gen No Cells This selection allows the preservation of bandwidth by preventing the transmission of any cells. An under flow condition occurs at the far end CBR port FIFO and the far end CBR port FIFO transmits all 1s to the far end terminal device.

5.23.11 Using Loopbacks

Port Loopback is used for testing only. To configure this port for normal operation, make sure this field is set to None. Refer to the *CellPath 300 ATM WAN Installation and Maintenance Manual* for more information about the Port Loopback field.

5.23.12 Exiting the Screen

The [^Apply] button applies any changes made in this screen, without exiting the screen. The keyboard equivalent is <Ctrl-A>.

The [^OK] button applies any changes made in this screen, then exits the screen. The keyboard equivalent is <Ctrl-O>.

The [^Cancel] button exits the screen without applying any changes made in the screen. The keyboard equivalent is <Ctrl-C>.

CHAPTER 6 Configuring Connections

This chapter describes the procedures to configure connections on the *CellPath* 300. The topics in this chapter include the following:

- How to access the configuration screens
- Adding and editing connections
- Guidelines for specifying the proper bandwidths for connections
- Guidelines for configuring connections from a protocol perspective
- Viewing connections
- Deleting connections
- Clearing connections
- Guidelines for configuring Frame Relay Link Management (FRLM)

6.1 Overview

This chapter covers all topics regarding connections, including viewing, deleting, adding, and editing. However, adding and editing a unicast connection is perhaps the key topic for most users. To add or edit a connection it is necessary to understand how to specify the correct parameters, including port mapping, the VPI/VCIs, the AAL, and bandwidth.

This chapter provides several sections designed help with the task of configuring connections on the *CellPath* 300. It is recommended that the following material be read before attempting to configure connections on the *CellPath* 300 if this has never been done before:

- **Chapter 2 and Chapter 3 -** Outline the basics of ATM networks and the internal operations of the *CellPath* 300.
- **Section 6.3 -** Provides an overview of connection parameters, both bi-directional and unidirectional, and a description of the `View/Add/Edit ATM Unicast Connection` screen.
- **Section 6.4 -** Provides guidelines for specifying the correct bandwidths and priority for a connection.
- **Section 6.5 -** Provides information on configuring cross-connections based on specific interface types. Tables are provided to aid in selecting the correct parameters for configuring a cross-connect between two ATM UNI interfaces, between Frame Relay and ATM UNI interfaces, etc.

- **Section 6.9 -** Provides information on configuring Frame Relay Link Management (FRLM) operational modes. Detailed information is provided on configuring FRLM generation of OAM cells.

6.2 Accessing the Configuration Screens

There are various screens for configuring connections. These screens enable the user to see a list of ATM Connections, or to view, add, or edit connections associated with a port.

There are three screens for configuring connections (Figure 6.1): the `ATM Connections` screen, the `View/Add/Edit ATM Unicast Connection` screen, and the `View/Add/Edit Multicast Connection` screen.

To see a listing of all the connections for all ports of the *CellPath* 300, open the `ATM Connections` screen by pressing the `[Connections]` button on the `System Configuration` screen. To see connections for a specific port, access the `ATM Connections` screen from the `Port Configuration` screen or the `Quad Port Selection` screen.

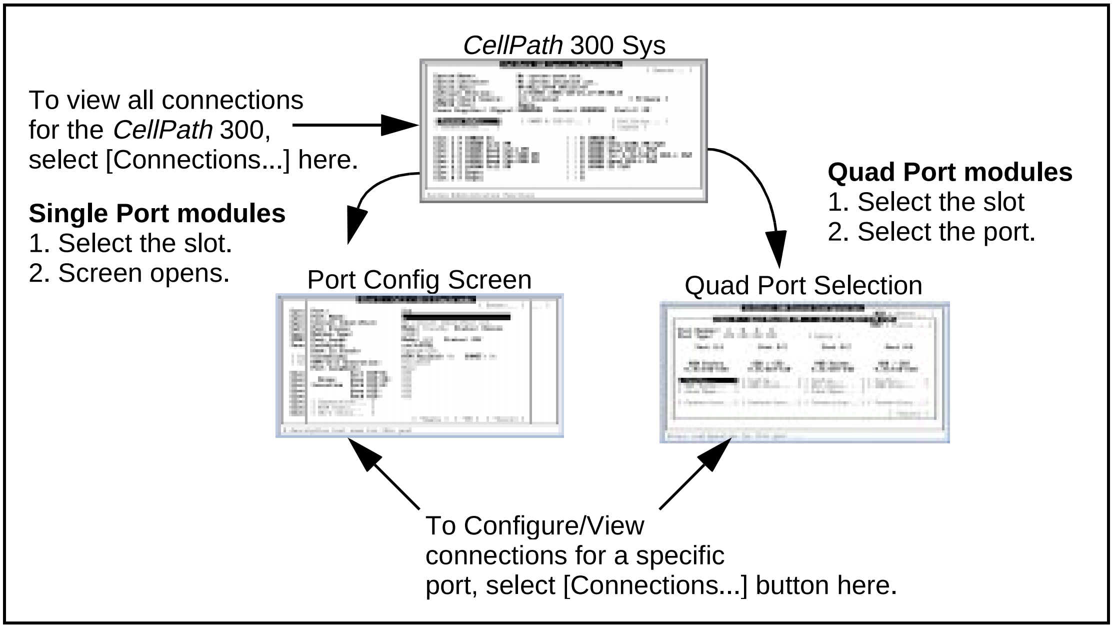


Figure 6.1 - Accessing the ATM Connections Screen

From the `ATM Connections` screen the user can open the other two screens (Figure 6.2) and use them to view, edit, or add connections associated with the port.

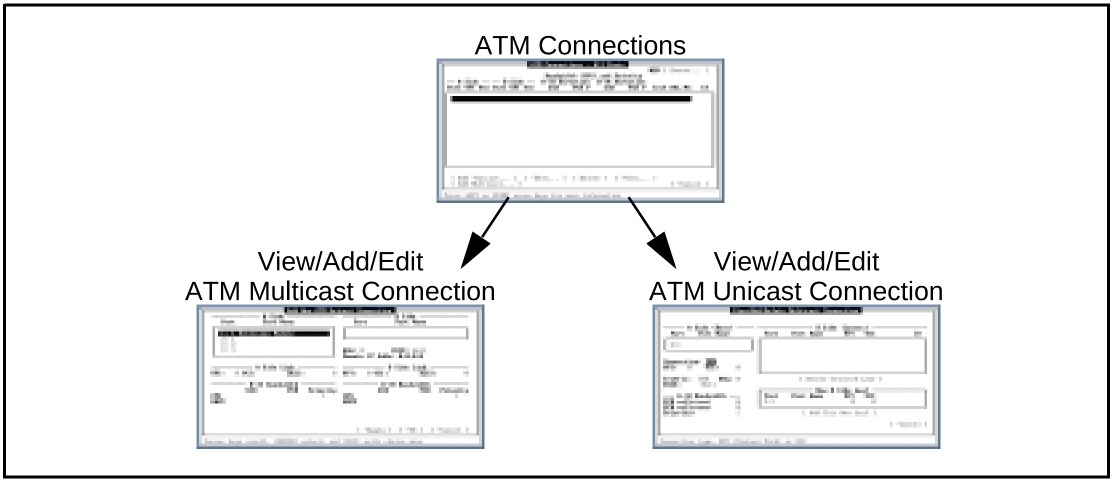


Figure 6.2 - Accessing Other ATM Connections Screens

6.3 Adding or Editing Unicast Connections

A single screen is provided for both adding new unicast connections and editing existing unicast connections. If the user opens a screen to edit an existing connection, the parameters assigned that connection are listed in the fields of the screen so that they can be changed. The use of the screen is basically the same whether adding or editing.

6.3.1 Basic Connection Parameters

Each connection has basic parameters that must be assigned. These are:

- Mapping of each side of the connection. Mapping consists of the port and VPI/VCI for each side. For the purpose of internal record-keeping, the sides are referred to as the A side and the B side in the user interface screens.
- Connection type, either path or channel.
- Traffic type, either constant bit rate (CBR) or variable bit rate (VBR).
- AAL type, which specifies which assembly and reassembly protocol to use on packet ports, and is used for early packet discard (EPD) on cell ports.

- Service Specific Convergence Sublayer (SSCS), which, in the *CellPath* 300, applies mainly to Frame Relay traffic, and specifies whether network interworking or service interworking is employed.
- Bandwidth and priority, which establishes the peak cell rate (PCR), sustainable (SCR) cell rate, and the priority of the connection.

6.3.2 Accessing the View/Add/Edit ATM Unicast Screen

To open the `ATM Unicast` screen, open the `ATM Connections` screen, and then open the `View/Add/Edit Unicast Connection` screen (Figure 6.3), as described in Section 6.2. If editing or viewing an existing connection, select the connection from the list before opening the `View/Add/Edit ATM Unicast Connection` screen.

NOTE

The title may say `View`, `Add`, or `Edit` depending on how the screen was opened. Additionally, the `[Frame Relay/ATM Interworking Options...]` appears only if a `Frame Relay` port is configured as the `A-side` or `B-side Port`.

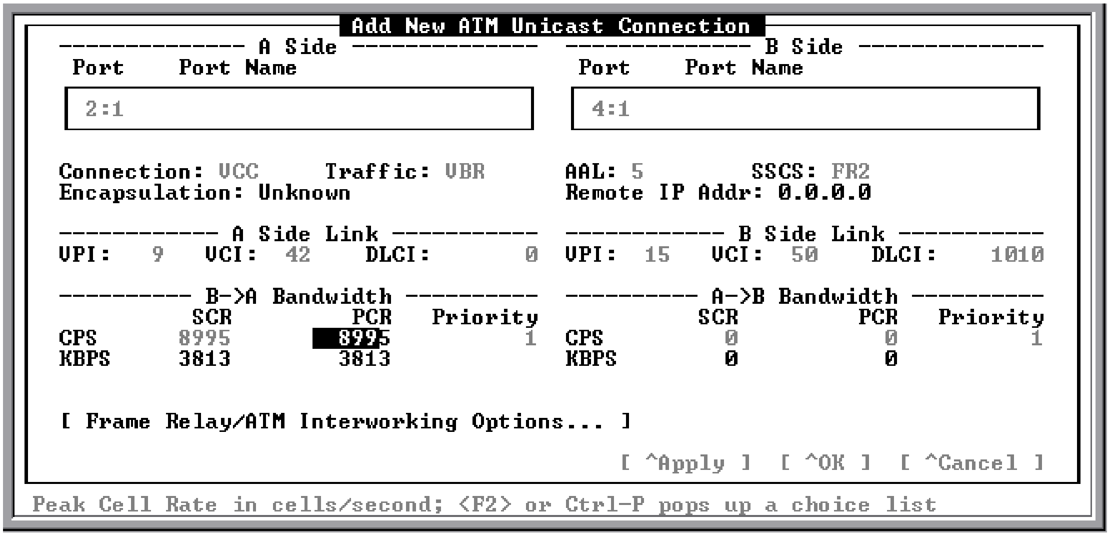


Figure 6.3 - Add New ATM Unicast Connection Screen

6.3.3 Specifying Ports for the A and B Sides of a Connection

Each unicast connection is associated with two ports on the *CellPath* 300. One of these ports is called the A side of the connection, and the other is called the B side. On a bidirectional, unicast connection, traffic received at the A side port is switched through the *CellPath* 300 and transmitted out the B side port, and vice versa. It does not matter which port the A and B sides are assigned to, as long as they are the ports through which the connection is to pass. The A and B side designations are maintained by the *CellPath* 300 for internal record keeping only and have no effect on the function of the connection.

NOTE For information about which parameters to choose for connections based on interface type, see Section 6.5.

6.3.3.1 Selecting the Ports

When opening the screen, the cursor appears in the `A side` field. Scroll to the desired port and press `<ENTER>`. The cursor moves to the `B side` field. Scroll to the desired field and press `<ENTER>`.

Ports are identified by a descriptive name (assuming a name was assigned when the port was configured) and a number in the format *slot:port*, where *slot* is a digit between 1 and 8 indicating the slot in the *CellPath* 300 in which the physical layer module is inserted, and *port* is a digit between 1 and 4 indicating the port on the physical layer module. Port 1:1 is the System Controller, and should be specified only when setting up an in-band connection to the *CellPath* 300 (see the *CellPath 300 ATM WAN Multiplexer User's Manual*).

6.3.4 Connection Type: VCC or VPC

Use the `Connection Type` field to specify whether the connection is a virtual path or a virtual channel. To select the connection type, tab to the `Connection Type` field and press the space bar to change between VPC and VCC. Refer to the *CellPath 300 ATM WAN Multiplexer User's Manual* for a description of the different connection types.

6.3.5 Specifying Connection Identifiers (VPI/VCI, DFA, DLCI)

Cross-connections are configured by specifying the VPI/VCIs for the virtual channels or virtual paths to be connected. Refer to the *CellPath 300 ATM WAN Multiplexer User's Manual* for a description of the role that connection identifiers play in configuring connections.

6.3.5.1 DFAs and DLCIs

Frame Relay and ATM DXI protocols use connection identifiers that are not in the same format as a VPI/VCI. Frame Relay uses a connection identifier called a Data Link Connection Identifier (DLCI) and ATM DXI uses a connection identifier called a DXI Frame Address (DFA). Though the formats are different, DFAs and DLCIs map directly to VPI/VCIs.

The *CellPath* 300 normally requires that all connection identifiers be specified as VPI/VCIs. If configuring a connection that involves a Frame Relay interface, a DLCI can be specified and the *CellPath* 300 automatically maps to the equivalent VPI/VCI. If configuring a connection that involves an ATM DXI interface, specify the DFA as a VPI/VCI. Refer to Appendix A.

6.3.5.2 VPI/VCI Restrictions and Guidelines

A VPI of 0 combined with VCIs in the range 0 through 31 are typically reserved for communicating management information between switches in the network. For this reason, do not assign those VPI/VCIs to ordinary user connections on ATM UNI cell ports or ATM DXI packet ports.

In cases in which the connection being routed through the *CellPath* 300 uses one of the reserved VPI/VCIs, it may be necessary to use non-restricted VPI/VCIs to pass the connection through the network. For instance, say a connection arrives at the *CellPath* 300 with the reserved VPI/VCI of 0, 5. The connection is being used to signal a device at the far end of an ATM network. The connection is passed through the *CellPath* 300 to a link connected to a public network. In the public network, the connection passes through an unknown number of nodes before reaching its endpoint. At the *CellPath* 300, it may be necessary to map the reserved VPI/VCI to a non-reserved VPI/VCI before introducing it to the network. If this is not done, a network connection that uses a reserved VPI/VCI may be introduced. In this case, it may be discarded by the network or cause network errors.

Even if the VPI is not 0, avoid assigning VCIs in the range of 0-31 for any ordinary user connection. These VPI/VCIs are typically reserved for special uses. However, unlike the first case, these special uses are under operator control and violating them is less likely to result in network problems.

Typically, VPI 0 is used for configuring virtual channel connections (VCCs). So for instance, the first virtual channel would be 0, 32, the next 0, 33, and so on. This provides 96 channels for VCCs (the 127 supported by the *CellPath* 300 minus the 32 reserved channels), which is adequate for most networks. Then, if creating connections that are to be bundled in a virtual path, use VPI 1 for the first bundle, VPI 2 for the next, and so on. This provides 255 virtual path connections. Using VPI 0 for channel connections is a commonly used guideline to help keep track of the configuration, and should not be considered a restriction.

6.3.5.3 Specifying a VPI/VCI

To specify a VPI/VCI, tab the cursor to the appropriate field and enter the following:

VPI An integer from 0 to 255 (see Section 6.3.5.2 for a discussion on restrictions and guidelines for specifying a VPI/VCI).

VCI An integer from 0 to 511 (see Section 6.3.5.2 for a discussion on restrictions and guidelines for specifying a VPI/VCI). Cell ports on Quad Cell Protocol Modules are limited to 127. Specifying a VCI is not required for a virtual path connection.

6.3.6 Specifying a Traffic Type (VBR or CBR)

Specify the traffic type only if configuring a connection between two ATM UNI cell ports. Cell ports have two buffering systems, one for VBR traffic and one for CBR traffic (see the *CellPath 300 ATM WAN Multiplexer User's Manual* for a discussion of cell ports). Specify the traffic type so that the *CellPath* 300 uses the correct buffering system. If the port through which the connections pass are anything other than two cell ports, this field is automatically set to the correct value and cannot be changed.

Use the space bar to toggle between options. The options are:

VBR For cells carrying variable bit rate traffic.

CBR For cells carrying constant bit rate traffic.

NOTE If unsure which to specify, consult Table 6.2.

6.3.7 Specifying the AAL

The ATM adaptation layer (AAL) controls how non-ATM traffic is segmented into ATM cells and how ATM cells are reassembled back to the original protocol.

When both sides of the connection are ATM UNI traffic (that is to say, traffic consists of cells already, so no conversion is necessary), it is still useful to specify an AAL. Doing so enables the *CellPath* 300 to perform early packet discard (EPD), which can improve network performance during times of congestion. In this case, specify the AAL that was used to adapt the traffic to ATM cells when it first entered the ATM network.

The four AAL options are AAL0, AAL1, AAL3/4, AAL5. See Table 6.2 for guidelines on selecting the correct option.

NOTE

Specifying the wrong AAL on a packet port halts throughput because the *CellPath* 300 is not able to segment and reassemble the traffic correctly. Specifying the wrong AAL on a cell port connection hampers throughput, but does not necessarily halt it. If poor throughput is experienced, check if the connection is using the correct AAL.

6.3.8 Specifying the SSCS

The `Service Specific Convergence Sublayer (SSCS)` field allows the header size of the cells in a connection carrying Frame Relay be specified. The options are `Null`, `FR 2`, `FR 4`, and `Unknown`. See Table 6.2 for guidelines on selecting the correct option.

6.3.9 Specifying the PCR, SCR, and Priority

Peak Cell Rate (PCR) and Sustained Cell Rate (SCR) are selected from a pop-up list of choices. The PCR and SCR do not have to be the same for both sides of the connection (asymmetric connections are supported). Select a priority from 1 to 4. One is the highest priority. See Section 6.4 for a discussion on how to chose appropriate bandwidths and priorities.

CBR connections For a CBR connection, the SCR and PCR are the same and priority is not valid.

Unidirectional connection For a unidirectional connection, specify a PCR and SCR of 0 for the appropriate direction.

Virtual path connection For a virtual path, select bandwidths for the path that are aggregate bandwidths of all the channels in the path (the *CellPath* 300 performs traffic management on the virtual path as a whole, not individual channels within the path).

6.3.10 Applying the Connection

Use the `[^Apply]` button to reconfigure the system with the new or edited connection. The information remains on the screen. If a valid connection was specified, the system is updated with the connection within a few seconds. Otherwise, an error message displays and the parameters in the screen need to be edited.

6.3.11 Dismissing the Screen

To dismiss the screen, select either the `[^OK]` button or the `[^Cancel]` button. The `[^OK]` button applies the cross-connection specified in the screen before closing the screen. The `[^Cancel]` button closes the screen without applying the cross-connection.

6.4 Specifying Bandwidth for a Connection

ATM's statistical multiplexing allows merging of connections from many ports onto a single port. When assigning connections there are many factors to consider: the number of connections that can be assigned on a port; the PCR, SCR, and priority to be used for each connection; and the possible effects on the quality of service.

NOTE

Before reading this section, the user should become familiar with the information contained in the *CellPath 300 ATM WAN Multiplexer User's Manual.*

This section provides guidelines on how to configure the PCR, SCR, and priority for VBR connections. Selecting a PCR, SCR, and priority can require some judgement when concentrating multiple channels on a cell port, or when merging channels on a packet port. In both these cases, statistical multiplexing is employed and the *CellPath* 300 performs traffic management on the connections as they exit the cell or packet port.

The section can aid the user in understanding the effect on the quality of service (QoS) as the ability to take advantage of statistical multiplexing when configuring more or fewer connections on a port.

To simplify a complex topic, this section takes the following approach.

- It shows one way to select a PCR for a connection.
- It shows how to determine the total available bandwidth of the port.
- It describes three different strategies for managing the aggregate bandwidth on a port.

6.4.1 Selecting a PCR for a Connection

6.4.1.1 Connection Involving a CBR Port

An active CBR connection has a guaranteed bandwidth that is never reduced due to congestion. As a result of this, a properly configured CBR connection has an SCR and PCR that are equal and a priority of 1.

The *CellPath* 300 automatically selects the proper PCR/SCR, based on the clock rate of the CBR port. The *CellPath* 300 uses the PCR/SCR to ensure that enough bandwidth is allocated on the cell bus, but it does not police CBR connections.

6.4.1.2 Connection Involving a Packet Port

This section describes how to choose a PCR for a VBR connection between two packet ports or a between a packet port and a cell port.

On a packet port, a given connection may burst to the total bandwidth of the port. For this reason, one useful approach is to assign a PCR that is equal to the total bandwidth of the packet port. If problems are experienced later, reduce the PCRs of connections as needed.

To determine the bandwidth of the connection in cps, estimate 173 cps for each 64 Kbps of clock rate on the packet port. If the connection is between two packet ports with different clock rates, use the port with the lesser rate to compute the bandwidth.

6.4.1.3 Connection Involving Two Cell Ports

Connections between two cell ports are by definition ATM connections. Therefore, the bandwidth and priority have already been determined by the ATM equipment connected to the *CellPath* 300. To configure a connection through the *CellPath* 300, simply match the parameters on the connecting equipment.

6.4.2 Determining Available Bandwidth for VBR Traffic

This section describes how to determine the bandwidth available for VBR traffic on cell ports and packet ports. Knowing the available bandwidth on a port is helpful when assigning bandwidths to the connections that use the ports. By considering whether the aggregate bandwidth assigned to all the VBR connections is more than or less than the available bandwidth, some expectations can be set regarding the QoS to expect, as explained in Section 6.4.3.

On a given port, the bandwidth available for VBR traffic is defined as the total bandwidth of the port minus the aggregate bandwidth assigned to CBR connections. The bandwidth for CBR connections is subtracted because CBR connections have guaranteed bandwidth and are not subject to statistical multiplexing. Therefore, bandwidth used by CBR connections is never available to VBR connections.

6.4.2.1 Bandwidth for VBR Traffic on a Cell Port

Table 6.1 shows the total capacity of cell ports in cells per seconds. To determine the bandwidth available for VBR connections, subtract the aggregate bandwidth of all CBR connections on the port from the port capacity.

Table 6.1 - Total Capacity of Cell Ports in Cells Per Second

	Cells per Second	
Media	**HEC**	**PLCP**
DS1	3622.6 cps	3333.3 cps
E1	4528.3 cps	4210.5 cps
DS3	104226.4 cps	96000.0 cps
E3	80000.0 cps	72000.0 cps
OC3c/STM-1	353207.5 cps	NA
J2	14490.6 cps	NA
IMA DS1	14378.81	NA
IMA E1	17975.68	NA

6.4.2.2 Bandwidth for VBR Traffic on a Packet Port

By definition, all traffic on a packet port is VBR traffic (it is not necessary to subtract CBR bandwidth from the total capacity to determine the available bandwidth). To determine the available bandwidth for VBR traffic, estimate 173 cps for each 64 Kbps of clock rate on the packet port.

6.4.3 Allocating VBR Bandwidth

Figure 6.4 shows a graph which represents three strategies for configuring the connections on a port. The vertical axis represents the sum of the PCR bandwidths for all connections on the port. The horizontal axis represents the sum of the SCR bandwidths for all connections on the port. The dotted lines represent the total bandwidth available on the port, and divide the graph into four quadrants representing three useful strategies.

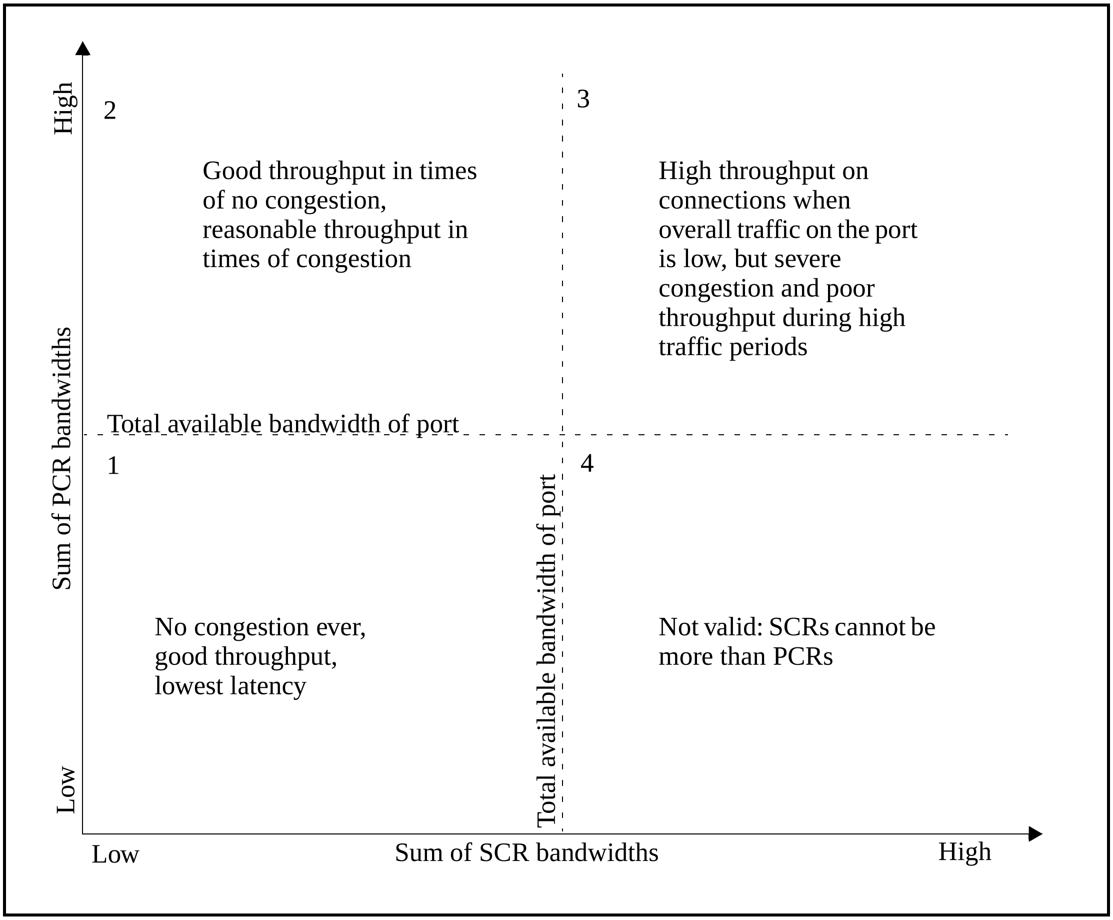


Figure 6.4 - Bandwidth Allocation Strategies

6.4.3.1 Strategy 1: Low PCR, Low SCR

Neither the aggregate PCR nor the aggregate SCR of the connections exceed the total bandwidth available to VBR traffic.

With this strategy, there is sufficient available bandwidth on the port to allocate every connection enough bandwidth to run without being subject to discard due to congestion. Note that both SCR and priority become essentially meaningless because the port can never congest and so the connections are never reduced to SCR. The VBR buffer remains practically empty and so latency caused by the traffic passing through the buffer is extremely low.

NOTE

If assigning a PCR that is equal to the total bandwidth capacity of the packet port the connection is passing through, as suggested in Section 6.4.1, it is not possible to achieve this strategy on any packet port that has more than one connection passing through it. However, it may be possible on a higher speed cell port that is handling multiple connections from a packet port.

This strategy is conservative and does not take advantage of ATM's capabilities to "over subscribe" a port. However, on some sites the main objective may be to merge various protocols on an ATM feed. While this setup may not make the most efficient use of the line, it does effectively merge traffic, and also provides high QoS, with virtually no discard and low latency.

NOTE

When configuring CBR connections on a cell port, the aggregate bandwidth of the CBR connections should never exceed the port bandwidth. The only exception to this is if the CBR connections are not all active, simultaneously.

6.4.3.2 Strategy 2: High PCR, Low SCR

The aggregate PCR exceeds the bandwidth available for VBR, but the aggregate SCR does not. With this strategy there is potential for the port to experience moderate congestion. This would occur if many of the connections ran at their PCR, such that the aggregate bandwidth of the actual traffic exceeded the available bandwidth on the port. The buffer would begin to fill and the traffic manager would begin reducing each connection's bandwidth to its SCR. At this point, the connections would begin to experience discard when bursting to rates greater than the SCR. Throughput of these reduced connections may suffer, but due to EPD, the loss can be minimized.

The level of congestion that must exist in order for a connection to be reduced to the SCR is based on the priority of the connection. If a lower cell loss ratio on a connection is desired, assign it a higher priority. Then as congestion builds, the traffic manager attempts to reduce it by first reducing the bandwidth of the connections with lower priorities. In other words, the higher priority connections get better service in times of congestion.

Strategy 2 is a reasonable, moderate approach. The port is over-subscribed to take advantage of the benefits of ATM technology, but it is never subject to severe congestion and the resulting lowered throughput that can occur with strategy 3.

NOTE

If the active connections did not run at peak rates simultaneously, service similar to strategy 1 can be expected. In other words, if aggregate bandwidth of the actual traffic never exceeds the port bandwidth, no connection experiences discard, nor appreciable latency caused by a full buffer.

This strategy takes some advantage of ATM statistical multiplexing with a risk of moderate congestion during peak traffic times.

6.4.3.3 Strategy 3: High PCR, High SCR

Both the aggregate PCR and the aggregate SCR exceed the total bandwidth of the port. This is an aggressive strategy that can result in severe congestion and significantly reduced throughput in times of congestion. In strategy 3, even if all channels are reduced to their SCRs there is still the potential for congestion to worsen to a state of severe congestion. As explained in *CellPath 300 ATM WAN Multiplexer User's Manual, Section 3.5.2,* severe congestion can cause partially transmitted packets to be discarded, lessening the efficiency of EPD. This, in turn, significantly impairs packet throughput, in comparison to strategy 2.

However, if the connections on the port are not all active simultaneously, this strategy may be effective. Remember that even though the aggregate SCRs of all connections is greater than the available bandwidth of the port, the actual aggregate traffic on the connections may not, and in fact may never, exceed the available bandwidth of the port. For this reason, congestion may not occur. In this case, the advantage is gained by giving each connection the largest possible PCRs and SCRs, thereby reducing discard caused by bandwidth enforcement.

So, if the connections pass traffic as expected, high throughput can be achieved. However, if they are all active simultaneously, severe congestion could occur, resulting in an adverse effect on throughput that is worse than in strategy 2.

This strategy takes full advantage of ATM statistical multiplexing at the risk of encountering severe congestion at peak traffic times.

6.4.3.4 Strategy 4: Low PCR, High SCR

The aggregate PCR does not exceed the total available bandwidth of the port but the aggregate SCR does. This strategy does not make functional sense, because by definition the SCR of a connection must be less than or equal to the PCR.

6.4.4 Recovering from the “! No Bandwidth Available” Condition

The *CellPath* 300 has a fixed amount of cell bus bandwidth for passing data between ports. For each module installed in the *CellPath* 300, cell bus bandwidth is allocated to handle the traffic that passes through the port or ports on the module.

If a combination of modules is inserted such that the bandwidth consumed exceeds the available cell bus bandwidth (for instance, 4 OC-3 / STM1 boards), the *CellPath* 300 cannot configure bandwidth on the cell bus for some of the modules and the ports on those modules do not work. In this case, for each such module, the message “! No Bandwidth Available” appears in the `System Configuration` screen, and the LEDs on the module are extinguished. Any module that appears in the `System Configuration` screen with its normal name has properly assigned bandwidth and functions normally.

To correct this situation, remove modules from the chassis until all remaining modules are accepted by the *CellPath* 300 and function normally.

If it is decided to remove the modules that show “! No Bandwidth Available,” simply pull them from the chassis. If, however, it is decided to remove one of the modules that is assigned bandwidth in order to activate one that is displaying “! No Bandwidth Available,” first remove the module that is assigned bandwidth, clear its configuration (if any), and then pull and re-insert the card that is displaying “! No Bandwidth Available.”

6.5 Configuring Cross-Connections

This section provides guidelines for configuring cross-connections between the various interfaces. The tables that follow also serve as a comprehensive list of all interface types between which a connection can be configured. The guidelines supplied here apply to both unicast and multicast connections.

Table 6.2 - Configuring ATM UNI and ATM UNI Connections

A port configured for ATM UNI supports multiple connections, limited only by the allowable VPI/VCIs. Use the following guidelines for each connection to be configured.		
For Virtual Channel Connections (VCCs)	VPI/VCIs	Specify the VPI/VCIs of the two links to cross-connect.
	Traffic type	Specify either VBR or CBR, depending on the type of traffic on the connection.
	AAL	Specify the AAL of the traffic running on the connection. If the AAL is not known, specify AAL0, although this disables EPD for the connection.
	SSCS	Specify Unknown.
	Bandwidth	Match the incoming bandwidth on each side of the connection. Be aware that a bidirectional connection may have asymmetrical bandwidths.
For Virtual Path Connections (VPCs)	VPI/VCIs	Specify just the VPIs of the two connections to cross-connect.
	Traffic type	If traffic in the path is all one type, specify that traffic type. If the traffic is mixed, specify VBR. In this case, CBR traffic passes through the VBR buffering system, possibly producing poor-quality CBR service (e.g., congestion could result in discarded cells and increased cell delay variation.)
	AAL	Specify AAL0.
	SSCS	Specify Unknown.
	Bandwidth	Specify a bandwidth equal to the aggregate bandwidth of the channels in the path. Note that a bidirectional connection may have asymmetrical bandwidths.

Table 6.3 - Configuring ATM UNI and Frame Relay Connections

Ports configured for either of these two interfaces support multiple connections. Use the following guidelines for each connection to be configured.		
For Virtual Channel Connections (VCCs)	VPI/VCIs	Specify the connection identifiers of the two connections to cross-connect. For the ATM UNI side of the connection, specify a VPI/VCI in the `Add/Edit Unicast Connection` screen; for the Frame Relay side, specify a DLCI in the `DLCI` field of the screen.
	Traffic type	Specify VBR.
	AAL	Specify AAL5.
	SSCS	Specify one of the following: Null - If the connection supports Frame Relay Service Interworking. FR 2 - If the connection supports Frame Relay Network Interworking with 2-byte headers. In this case, the packet port that the connection passes through should also be configured for 2-byte headers. FR 4 - If the connection supports Frame Relay Network Interworking with 4-byte headers. In this case, the packet port that the connection passes through should also be configured for 4-byte headers.
	Bandwidth	Specify an SCR equal to the committed information rate of the Frame Relay connection. Specify a PCR that accommodates the committed burst size + excess burst size of the Frame Relay connection.
For Virtual Path Connections (VPCs)	Virtual path connections are not available for Frame Relay ports.	
Frame Relay Service Interworking	Cell Loss Priority (CLP) mode	Specifies how the CLP bit is set in the cell headers of all cells segmented from the Frame Relay frames on this PVC. **MAP From DE** (default) -Copies the DE bit from the Frame Relay frame header directly into the ATM cell header's CLP bit. **Set to 0 -** Sets the ATM cell header's CLP bit to 0. **Set to 1 -** Sets the ATM cell header's CLP bit to 1.

Table 6.3 - Configuring ATM UNI and Frame Relay Connections

	Discard Eligibility (DE) mode	Specifies how the DE bit in the Frame Relay frame header is set when ATM cells are reassembled into Frame Relay frames. **Map From CLP** (default) **-** Sets the DE bit in the Frame Relay frame header to 1 if any ATM cell in the frame is received for reassembly with its CLP bit set to 1. It sets the DE bit to 0 if all cells received for reassembly have CLP set to 0. Use this option if tagging actions in the ATM network are to affect Frame Relay congestion actions. **Set to 0 -** Sets the DE bit in the frame header to 0. **Set to 1 -** Sets the DE bit in the frame header to 1.
	Explicit Forward Congestion Indication (EFCI) mode	Specifies how EFCI is set in the ATM cell headers of cells segmented from Frame Relay frames. **Set to 0** (default) **-** Sets EFCI in the ATM cell header to 0 to indicate “congestion not experienced” for all cells segmented from Frame Relay frames on this PVC. **MAP from FECN -** Sets EFCI in the ATM cell header to 1 for all cells segmented from a Frame Relay frame received with its FECN bit set to 1. It sets EFCI to 0 if FECN is received as 0.
	Upper Layer User Protocol Encapsulation mode	Specifies whether the upper layer protocol encapsulation is translated from RFC1490 to RFC 1483 in the Frame Relay-to-ATM direction, and from RFC1483 to RFC1490 in the ATM-to-Frame Relay direction. **Transparent Mode** (default) **-** Performs no translation of the upper layer protocol encapsulation. Use this option if the terminal equipment at the endpoints of the connection use the same encapsulation or if they are able to adapt to each other’s encapsulation. **Translation Mode -** Translates RFC1490 encapsulated frames to RFC1483 encapsulated frames prior to segmenting the frames into cells. Cells received for reassembly on this PVC are expected to contain frames encapsulated with RFC1483. This mode translates the reassembled frames to RFC1490 encapsulation before transmitting them as Frame Relay frames. Received frames or frames reassembled from cells that contain an unrecognized encapsulation are discarded per FRF.8. Use this option when the Frame Relay side endpoint uses RFC1490 encapsulation and the ATM side endpoint uses RFC1483.

Table 6.3 - Configuring ATM UNI and Frame Relay Connections

Frame Relay Service Interworking	Cell Loss Priority (CLP) mode	Specifies how the CLP bit is set in the cell headers of all cells segmented from the Frame Relay frames on this PVC. **MAP From DE** (default) **-**Copies the DE bit from the Frame Relay frame header directly into the ATM cell header's CLP bit. **Set to 0 -** Sets the ATM cell header's CLP bit to 0. **Set to 1 -** Sets the ATM cell header's CLP bit to 1.
	Discard Eligibility (DE) mode	Specifies how the DE bit in the Frame Relay frame header is set when ATM cells are reassembled into Frame Relay frames. **Map From CLP** (default) **-** Sets the DE bit in the Frame Relay frame header to 1 if any ATM cell in the frame is received for reassembly with its CLP bit set to 1. It sets the DE bit to 0 if all cells received for reassembly have CLP set to 0. Use this option if tagging actions in the ATM network are to affect Frame Relay congestion actions. **Use FR-SSCS DE -** For Frame Relay Network Interworking, the entire Frame Relay frame header is included in the payload of the first cell segmented from the frame. This option takes the value of the DE bit from the DE bit in the transported Frame Relay frame header. Use this option to insulate Frame Relay congestion actions from ATM network tagging/ congestion options.
	Explicit Forward Congestion Indication (EFCI) mode	Not applicable. Defaults to the only valid option for Frame Relay Network Interworking.
	Upper Layer User Protocol Encapsulation mode	Not applicable. Defaults to the only valid option for Frame Relay Network Interworking.

Configuring Connections

Table 6.4 - Configuring ATM UNI and ATM DXI Connections

Ports configured for either of these two interfaces support multiple connections. To identify connections, ATM DXI uses a DXI Frame Address (DFA) instead of a VPI/VCI. Use the following guidelines for each connection to be configured.		
For Virtual Channel Connections (VCCs)	VPI/VCIs	Specify the connection identifiers of the two connections to cross-connect. For the ATM DXI side of the connection, it may be necessary to map a DFA to a VPI/VCI. See Appendix A for instructions.
	Traffic type	Specify VBR.
	AAL	Specify one of the following: AAL5 - If the VCC carries Frame Relay service. AAL3/4 - If otherwise.
	SSCS	Specify Null.
	Bandwidth	If the VCC carries Frame Relay service, specify an SCR equal to the committed information rate of the Frame Relay connection; specify a PCR that accommodates the committed burst size + excess burst size of the Frame Relay connection.
For Virtual Path Connections (VPCs)	ATM DXI connections may be bundled into a virtual path. However, the ATM DXI connections must have DFAs that translate to VPI/VCIs with the same VPI. All channels in the virtual path must have the same AAL.	
	VPI/VCIs	Specify just the VPIs of the two connections to cross-connect.
	Traffic type	Specify VBR.
	AAL	Specify one of the following: AAL5 - If the VPC carries Frame Relay service. AAL3/4 - If otherwise.
	SSCS	Specify Null.
	Bandwidth	If the VPC carries Frame Relay service, specify an SCR equal to the committed information rate of the aggregate Frame Relay connections. Specify a PCR that accommodates the committed burst size + excess burst size of the aggregate Frame Relay connections.

Table 6.5 - Configuring ATM UNI and HDLC Connections

A port that supports the HDLC interface supports packets that map to a single ATM channel on the ATM UNI port.		
For Virtual Channel Connections (VCCs)	VPI/VCIs	On the ATM UNI side of the cross-connection, specify a VPI/VCI. On the HDLC side of the cross-connection, specify any valid, unused VPI/VCI. Because HDLC does not support multiple connections, the device on the HDLC side of the cross-connection does not use connection identifiers. However, the *CellPath* 300 requires a connection identifier be specified.
	Traffic type	Specify VBR.
	AAL	Specify AAL5.
	SSCS	Specify Null.
	Bandwidth	Specify the desired PCR and SCR.
For Virtual Path Connections (VPCs)	Because HDLC supports only a single connection, virtual path connections are not applicable.	

Table 6.6 - Configuring ATM UNI and CBR Connections

<table>
<tr><td colspan="3">A port configured for a CBR interface is treated by the CellPath 300 as a serial stream of binary data that maps into a single channel on an ATM port.</td></tr>
<tr><td rowspan="5">For Virtual Channel Connections (VCCs)</td><td>VPI/VCIs</td><td>On the ATM UNI side of the cross-connection, specify a VPI/VCI.

On the CBR side of the cross-connection, specify any valid, unused VPI/VCI. The device on the CBR side of the cross-connection does not use a connection identifier. However, the CellPath 300 requires a connection identifier be specified.</td></tr>
<tr><td>Traffic type</td><td>Specify CBR.</td></tr>
<tr><td>AAL</td><td>Specify AAL1.</td></tr>
<tr><td>SSCS</td><td>Specify Null.</td></tr>
<tr><td>Bandwidth</td><td>The PCR and SCR are automatically specified.</td></tr>
<tr><td>For Virtual Path Connections (VPCs)</td><td colspan="2">Because CBR supports only a single connection, virtual path connections are not applicable.</td></tr>
</table>

Table 6.7 - Configuring Frame Relay and Frame Relay Connections

<table>
<tr><td colspan="3">Ports configured for Frame Relay support multiple connections. Frame Relay uses a Data Link Connection Identifier (DLCI) instead of a VPI/VCI to identify connections. Use the following guidelines for each connection to be configured.</td></tr>
<tr><td rowspan="5">For Virtual Channel Connections (VCCs)</td><td>VPI/VCIs</td><td>Specify a DLCI in the <code>DLCI</code> field of the <code>Add/Edit Unicast Connection</code> screen for both sides of the cross-connection.</td></tr>
<tr><td>Traffic type</td><td>Specify VBR.</td></tr>
<tr><td>AAL</td><td>Specify AAL5.</td></tr>
<tr><td>SSCS</td><td>Specify one of the following:
Null - If the connection supports Frame Relay Service Interworking.
FR 2 - If the connection supports Frame Relay Network Interworking with 2-byte headers. In this case, the ports through which the connection passes should also be configured for 2-byte headers.
FR 4 - If the connection supports Frame Relay Network Interworking with 4-byte headers. In this case, the ports through which the connection passes should also be configured for 4-byte headers.</td></tr>
<tr><td>Bandwidth</td><td>Specify an SCR equal to the committed information rate of the Frame Relay connection.
Specify a PCR that accommodates the committed burst size + excess burst size of the Frame Relay connection.</td></tr>
<tr><td>For Virtual Path Connections (VPCs)</td><td colspan="2">Virtual path connections are not applicable for Frame Relay ports.</td></tr>
</table>

Table 6.8 - Configuring ATM DXI and ATM DXI Connections

<table>
<tr><td colspan="3">Ports configured for ATM DXI support multiple connections. ATM DXI uses a DXI Frame Address (DFA) instead of a VPI/VCI to identify connections. Use the following guidelines for each connection to be configured.</td></tr>
<tr><td rowspan="5">For Virtual Channel Connections (VCCs)</td><td>VPI/VCIs</td><td>Specify a VPI/VCI for both sides of the cross connection. See Appendix A for instructions.</td></tr>
<tr><td>Traffic type</td><td>Specify VBR.</td></tr>
<tr><td>AAL</td><td>Specify one of the following:
AAL5 - If the VCC carries Frame Relay service.
AAL3/4 - If otherwise.</td></tr>
<tr><td>SSCS</td><td>Specify Null.</td></tr>
<tr><td>Bandwidth</td><td>If the VCC carries Frame Relay service, specify an SCR equal to the committed information rate of the Frame Relay connection; specify a PCR that accommodates the committed burst size + excess burst size of the Frame Relay connection.</td></tr>
</table>

Table 6.8 - Configuring ATM DXI and ATM DXI Connections

For Virtual Path Connections (VPCs)	ATM DXI connections may be bundled in a virtual path for traversing the ATM Network. Note that in the case of a ATM DXI-to-ATM DXI cross-connection, the “ATM Network” is only the *CellPath* 300 bus that connects the ports. However, bundling the ATM DXI connections saves the trouble of having to configure each channel individually on the *CellPath* 300 (as always, it may be necessary to configure each connection individually on the ATM DXI device). In order to use a VPC cross-connection, the ATM DXI connections must have DFAs that translate to VPI/VCIs with the same VPI and all connections must use the same AAL.	
	VPI/VCIs	Specify just the VPI of the paths to cross-connect.
	Traffic type	Specify VBR.
	AAL	Specify one of the following: AAL5 - If the VPC carries Frame Relay service. AAL3/4 - If otherwise.
	SSCS	Specify Null.
	Bandwidth	If the VPC carries Frame Relay service, specify an SCR that is the aggregate of the bandwidth of all the channels in the path, where the bandwidth of each channel is equal to the committed information rate of the Frame Relay connection. Specify a PCR that accommodates the committed burst size + excess burst size of the Frame Relay connection.

Table 6.9 - Configuring HDLC and HDLC Connections

<table>
<tr><td colspan="3">A port that supports the HDLC interface supports packets that map to a single ATM channel on the ATM UNI port.</td></tr>
<tr><td rowspan="5">For Virtual Channel Connections (VCCs)</td><td>VPI/VCIs</td><td>Specify any valid, unused VPI/VCI for both sides of the cross-connection.

Because HDLC does not support multiple connections, the HDLC devices do not use connection identifiers. However, the CellPath 300 requires a connection identifier for each HDLC connection be specified.</td></tr>
<tr><td>Traffic type</td><td>Specify VBR</td></tr>
<tr><td>AAL</td><td>Specify AAL5</td></tr>
<tr><td>SSCS</td><td>Specify Null.</td></tr>
<tr><td>Bandwidth</td><td>Specify the desired PCR and SCR.</td></tr>
<tr><td>For Virtual Path Connections (VPCs)</td><td colspan="2">Because HDLC supports only a single connection, virtual path connections are not applicable.</td></tr>
</table>

Table 6.10 - Configuring CBR and CBR Connections

CBR connections are allowed only between CBR ports of the same type. For instance, a cross-connection between V.35/EIA-530 and DSX-1 ports cannot be made. For CBR connections between V.35/EIA-530 ports, the clock rates must be the same. A port configured for a CBR interface is treated by the *CellPath* 300 as a single connection that carries a serial binary data stream.		
For Virtual Channel Connections (VCCs)	VPI/VCIs	Specify any valid, unused VPI/VCI for both sides of the cross-connection. Because CBR does not support multiple connections, the CBR devices do not use connection identifiers. However, the *CellPath* 300 requires a connection identifier for CBR connections must be specified.
	Traffic type	Specify CBR.
	AAL	Specify AAL1.
	SSCS	Specify Null.
	Bandwidth	The PCR and SCR are automatically specified.
For Virtual Path Connections (VPCs)	Because CBR ports support only a single connection, virtual path connections are not applicable.	

6.6 Viewing/Adding/Editing ATM Multicast Connections

Use the View/Add/Edit Multicast Connection screen to add, edit or view a multicast connection. Multicast connections are like unicast connections, except that they are always unidirectional and the connection is one-to-many instead of one-to-one.

The A side of the connection is always the root of the multicast connection. Configuring the A side of a multicast connection is essentially the same as configuring a unicast connection: specify the AAL, the SSCS, the traffic type, and configure the bandwidths. For information about selecting values for these parameters, see Section 6.4 and Section 6.5.

To configure the B side of a multicast connection, use the New B Side Leaf field to specify the port and VPI/VCI and select the [Add This New Leaf] button. Repeat these steps for each B-side leaf of the multicast. Since the multicast connection is unidirectional, there is no B-to-A direction to the connection, and so there is no need to specify a B-to-A bandwidth.

NOTE

Certain restrictions apply for leaves of a CBR multicast connection that pass through the ports of a Quad Packet/CBR that is configured for CBR traffic. The leaves of a given multicast connection may pass through only the following combinations of ports; all four ports; ports 1 and 3; ports 1 and 2, ports 2 and 4; ports 3 and 4.

6.6.1 Accessing the Screen

To add a multicast connection, open the ATM Connections screen as described in Section 6.2. Then select the [Add Multicast Connection...] button.

To edit a multicast connection, open the ATM Connections screen and select the multicast connection (Figure 6.5) to edit (multicast connections are identified by an “MC” in the “MC” column). Then select the [^Edit] button.

To view a multicast connection, open the ATM Connections screen and select the multicast connection to edit. Then select the [^View] button.

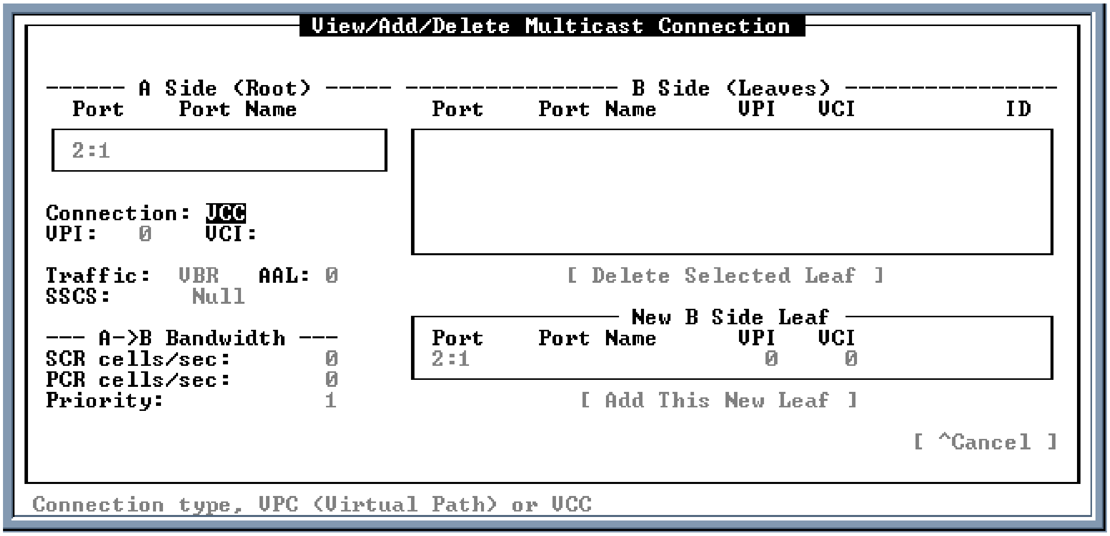


Figure 6.5 - View / Add / Delete a Multicast Connection

6.7 Viewing ATM Unicast Connections

Unicast connection parameters can be viewed in the ATM Connections screen, which can be accessed through the System Configuration screen or through Port Configuration screens. The screen can be "scrolled" by using the right and left arrow keys to view additional parameters.

6.7.1 Accessing the Screen

The ATM Connections screen lists all the connections that pass through a given port if accessed from a Port Selection or Port Configuration screen. If accessed from the System Configuration screen, the ATM Connections screen lists all the connections in the *CellPath* 300.

The connection list and the port totals are updated in real-time as connections are configured.

The ATM Connections screen for all ports (Figure 6.6) does not include a section displaying totals as it does for the individual port ATM Connections screen. The listings are sorted only by the A-Side ports for the all ports display.

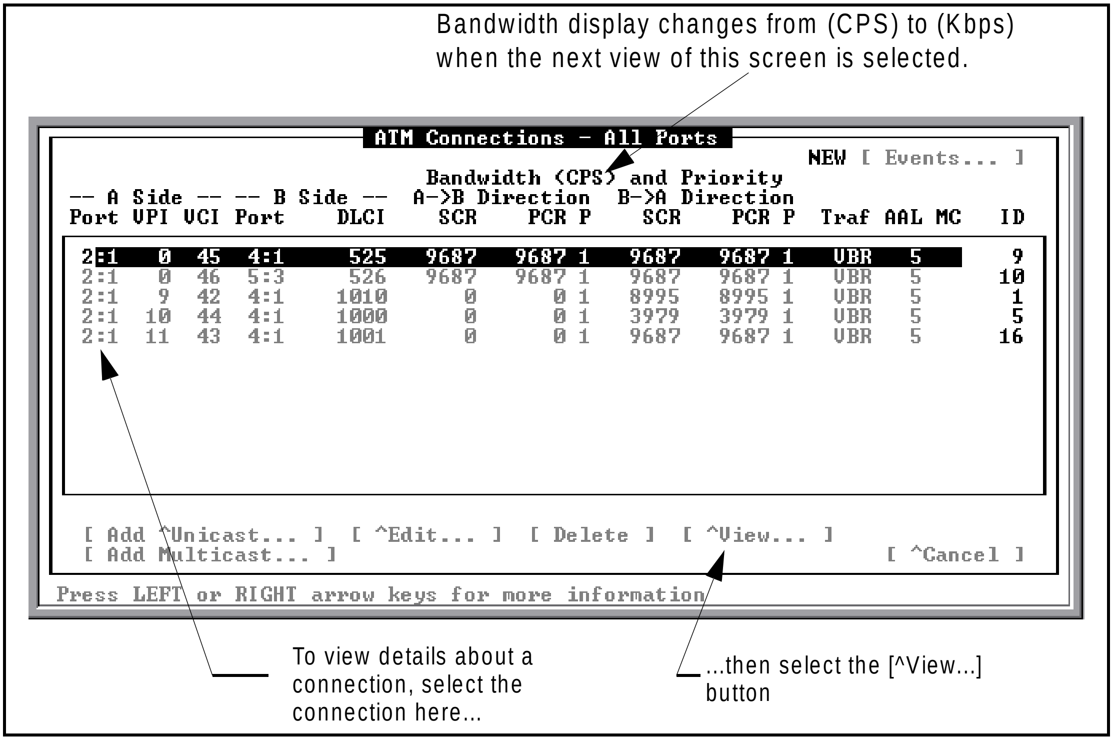


Figure 6.6 - ATM Connections Screen - All Ports

6.7.2 Using the Arrow Keys to View Parameters

The left-most columns of this screen (the A-Side port and connection identifiers, and the B-Side port and connection identifiers) appear in every view of this screen. Use the right and left arrow keys to access additional parameters. The first right-arrow press changes the bandwidth display from cells-per-second (CPS) to kilobits-per-second (Kbps). Two more presses of the right arrow presents two more views (see examples on next page)—then the next right-arrow press repeats the first view (shown above). Use the left arrow key to reverse the “direction” and cycle through all four views as well.

Figure 6.7 shows information for in-band management connections that go to the System Controller.

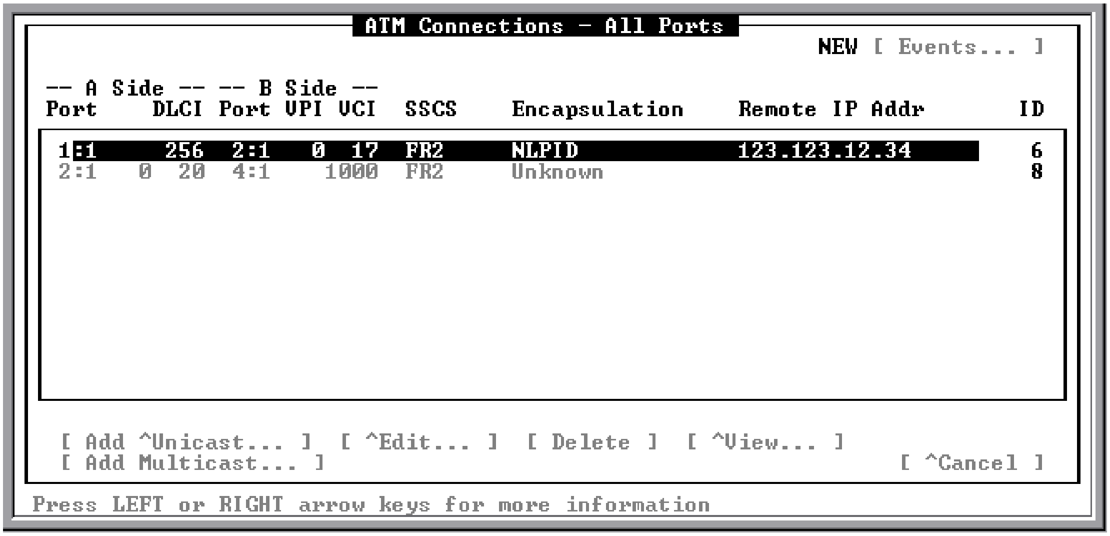


Figure 6.7 - ATM Connections In-Band Management Screen

Figure 6.5 displays the `ATM Connections` screen showing the current status of Frame Relay connections. These parameters can be viewed by opening the `ATM Connections` screen and scrolling the display horizontally using the left and right arrow keys. Scroll the display until the list heading “Frame Relay/ATM Interworking Modes” is visible. All settings shown are “per PVC.”

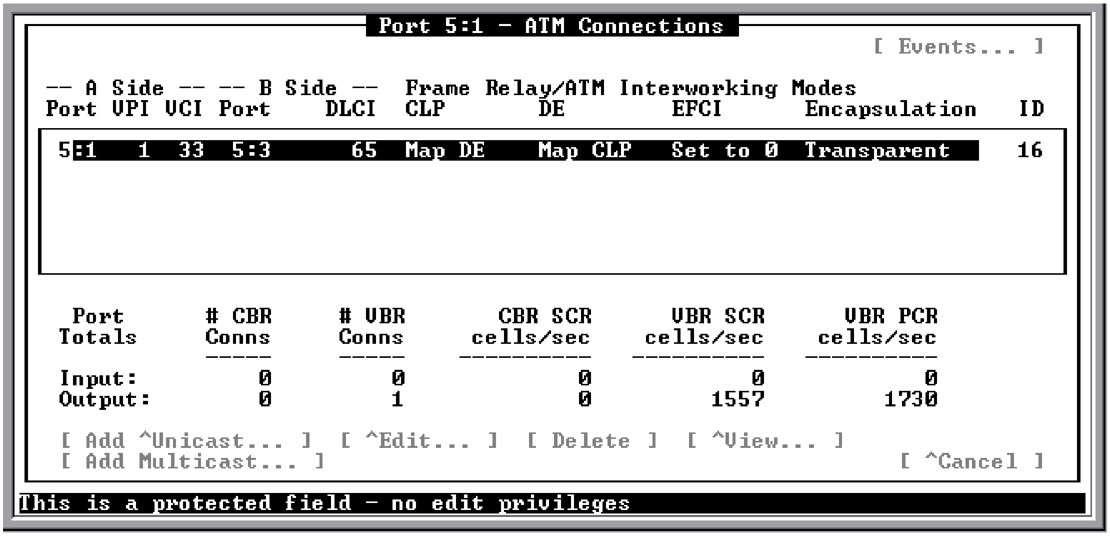


Figure 6.8 - ATM Connections Frame Relay Connections Screen

A side port Port associated with the A side of the connection. Ports are identified by *slot:port*, where *slot* is an integer, 1 through 8, indicating the slot in the *CellPath* 300 card cage in which the physical layer module (PLM) is inserted, and *port* is an integer, 1 through 4, indicating the port on the PLM. Only the A-side ports are sorted when this screen is displaying listings for all ports.

A side VPI A side virtual path identifier for the connection.

A side VCI A side virtual channel identifier for the connection.

A side DLCI A side DLCI for a Frame Relay connection.

B side port Same as “A side port,” but applies to the B side. However, only the A-side ports are sorted when this screen is displaying listings for all ports.

B side VPI B side virtual path identifier for the connection.

B side VCI B side virtual channel identifier for the connection.

B side DLCI B side DLCI for a Frame Relay connection.

Variable Bandwidth A -> B Direction

SCR Bandwidth of the connection's sustained cell rate (SCR) in cells per second (CPS) or kilobits-per second (Kbps).

PCR Bandwidth of the connection's peak cell rate (PCR) in cells per second (CPS) or kilobits-per second (Kbps).

Priority Priority of the connection, with 1 being the lowest and 4 being the highest.

Variable Bandwidth B -> A Direction

SCR Bandwidth of the connection's sustained cell rate (SCR) in cells-per-second (CPS) or kilobits-per second (Kbps).

PCR Bandwidth of the connection's peak cell rate (PCR) in cells per second (CPS) or kilobits-per second (Kbps).

Priority Priority of the connection, with 1 being the lowest and 4 being the highest.

Traf Traffic type on the connection, either VBR or CBR.

AAL ATM Adaptation Layer for the connection. Possible values are 0, 1, 3/4, and 5. AAL0 indicates an unknown AAL.

MC Multicast connection flag. If the letters MC is displayed in the column, the connection is a member of a multicast group. In the *CellPath* 300, a multicast connection is stored as a group of connections. Each connection in the group has the same A side but different B sides. Each of these connections is listed in the Connections list and identified with an MC flag. To see a comprehensive list of all the B side leaves in a multicast group, select the connection, then select the `[^View]` button. If the MC column is empty, the connection is a unicast connection.

ID Internal identifier for the connection assigned by the *CellPath* 300.

SSCS Type of Service Specific Convergence Sublayer (SSCS) for the connection. Possible values are Null, FR 2, FR 4, and Unknown.

Encapsulation Type of network layer encapsulation used for the virtual connection.
Possible values for IP / AAL5 traffic are: Null, LLC / SNAP, NLPID, EtherType.
Possible values for non-IP / AAL5 traffic are FR Link Mgmt and Unknown.

Remote IP Addr Address, in standard IP format (*nnn.nnn.nnn.nnn*), of the remote management station at the endpoint of the in-band connection. This field is left blank for non-IP / AAL5 connections.

#CBR Conns Total number of input and output CBR connections provisioned on the port. Virtual channels and virtual paths are both included in the count.

#VBR Conns Total number of input and output VBR connections provisioned on the port. Virtual channels and virtual paths are both included in the count.

CBR SCR cells/s Total bandwidth configured by all CBR connections on the port.

VBR SCR cells/s Total bandwidth assigned to the sustained cell rates of all VBR connections on the port, with separate values for the input direction and the output direction.

VBR PCR cells/s Total bandwidth assigned to the peak cell rates of all VBR connections on the port, with separate values for the input direction and the output direction.

Status Indicates the status of the connection and may consist of a combination of the following values (note that “A:” and “B:” refer to the A-side or B-side port of the connection):

Pending AdditionSomeone has added a connection but the *CellPath* 300 has not yet updated the configuration. This condition lasts only a split second.

A:OOS(Out of service) Either a protocol module or physical layer module on which the

B:OOSconnection terminates has been removed from the *CellPath* 300 card cage.

A:ObsoleteEither a protocol module or physical layer module on which the connection

B:Obsolete	terminates has been removed from the *CellPath* 300 card cage and replaced with a different kind of protocol module or physical layer module.
A:Oper-Down	(Operationally Down) The port has a physical layer or protocol layer alarm
B:Oper-Down	condition, or an FRLM service-affecting condition.
A:Lrn-Inact	(Learned Inactive) The neighboring device reported that the virtual link through it
B:Lrn-Inact	is inactive.
A:Lrn-Act	(Learned Active) The neighboring device reported that the virtual link through it
B:Lrn-Act	is active.
A:Rep-Inact	(Reported Inactive) The *CellPath* 300 reported to the neighboring device that the
B:Rep-Inact	virtual link to and from this port is inactive.
A:Rep-Act	(Reported Active) The *CellPath* 300 reported to the neighboring device that the virtual
B:Rep-Act	link to and from this port is active.
A:Rx-AIS	(Receiving AIS) This port is receiving AIS OAM cells through some other port
B:Rx-AIS	on an ATM virtual connection whose ultimate end-point is this port.
A:Rx-RDI	(Receiving RDI) This port is receiving RDI OAM cells through some other port

B:Rx-RDI	on an ATM virtual connection whose ultimate end-point is this port.
A:Gen-AIS	(Generating AIS) This port is generating AIS OAM cells that are passed out
B:Gen-AIS	onto an ATM virtual connection through some other port.
A:Gen-RDI	(Generating RDI) This port is generating RDI OAM cells that are passed out
B:Gen-RDI	onto an ATM virtual connection through some other port.

6.8 Deleting Connections

To delete a unicast connection, use the `ATM Connections` screen. To delete a multicast connection or to delete a single leaf from a multicast connection, use the `View/Add/Edit Multicast` screen. To delete all connections on the *CellPath* 300, use the `System Utilities` screen.

To delete a unicast connection, select the connection in the connection list, then select the `[Delete]` button. The selected connection is deleted without confirmation. If the connection is a multicast, only the leaf specified in the list is deleted. The best way to delete an entire multicast connection is to use the `View/Add/Edit Multicast` screen (see Section 6.8.2).

6.8.1 Accessing the Screen for Deleting a Unicast Connection

To access the `ATM Connections` screen shown in Figure 6.9, follow the instructions in Section 6.2.

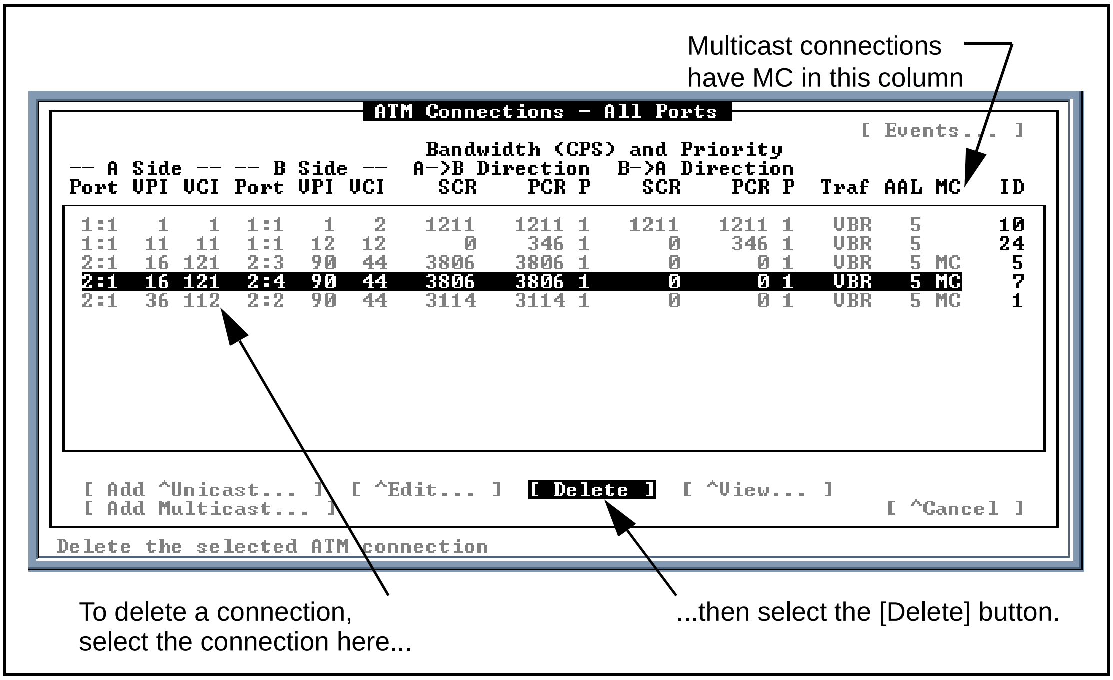


Figure 6.9 - Using ATM Connections Screen to Delete a Unicast Connection

6.8.2 Deleting a Multicast Connection or Leaf

To delete a leaf of a multicast connection, use the `View/Add/Edit Multicast Connection` screen. Select the leaf to be deleted in the `B Side` field, then select the `[Delete Selected Leaf]` button. The leaf is deleted without confirmation.

To delete an entire multicast connection, simply delete all of the leaves.

6.8.2.1 Accessing the Screen

To access the screen, open the `ATM Connections` screen and select the multicast connection. A multicast connection can be identified in the `ATM Connections` screen by an "M" in the MC column. Once the multicast connection is selected, select the `[^Edit]` button to open the `View/Add/Edit Multicast Connection` screen (Figure 6.10).

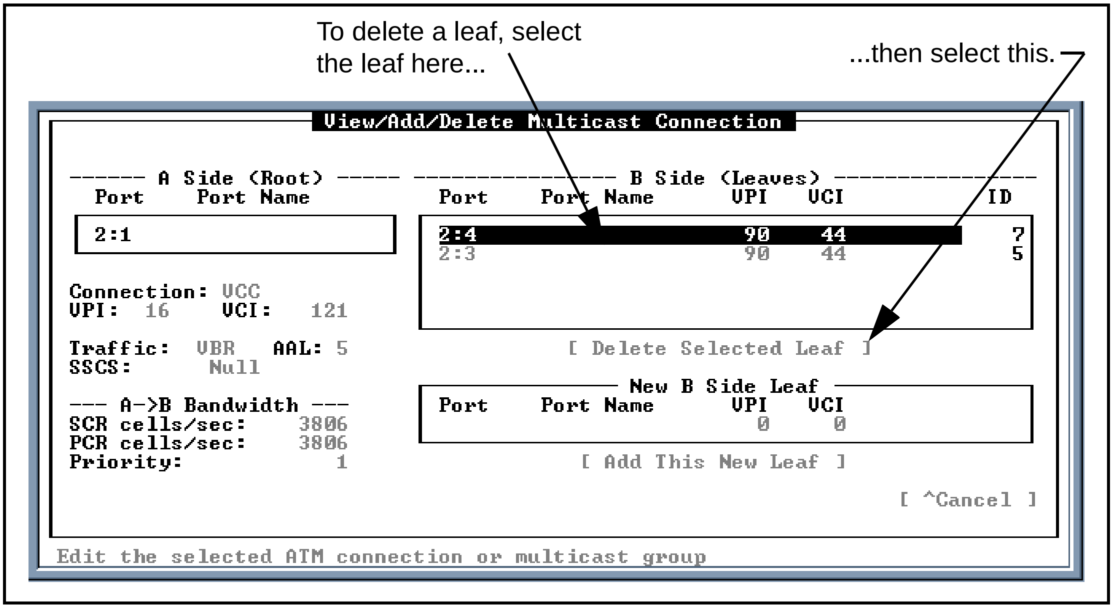


Figure 6.10 - View / Add / Edit Multicast Connections

6.8.3 Deleting all Connections

All connections on all ports can be deleted from the `System Utilities` screen.

NOTE If all of the connections are deleted, the only way to restore them is to reconfigure them individually.

6.8.3.1 Accessing the Screen

The `System Utilities` screen can be accessed as follows. In the *CellPath* 300 `System Configuration` screen, select the `[Utilities...]` button. The `System Utilities` screen appears on the screen (Figure 6.11).

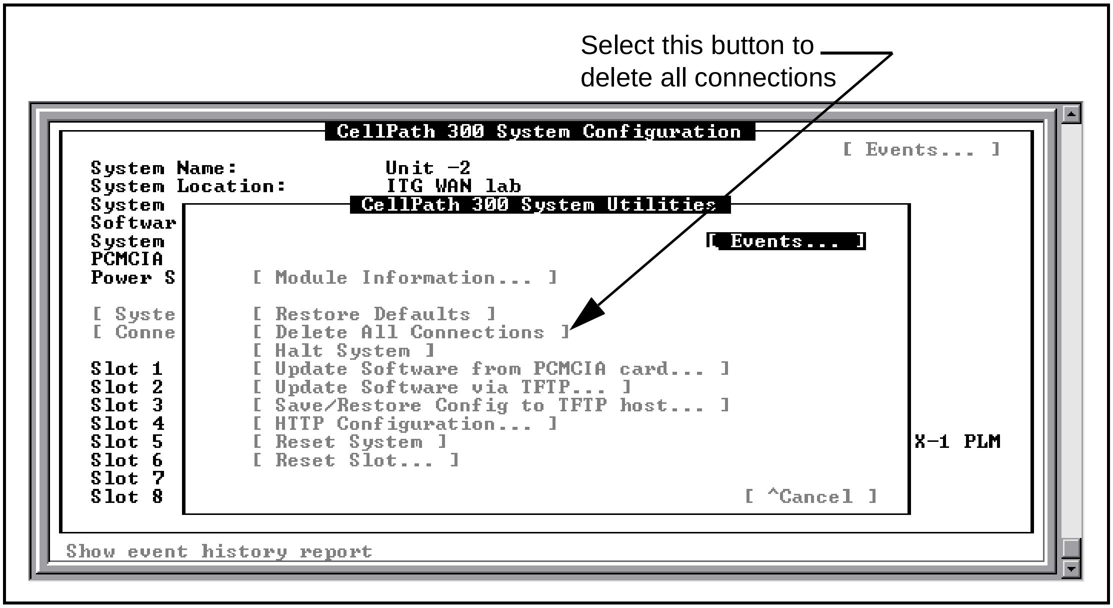


Figure 6.11 - System Utilities Screen

6.9 Frame Relay/ATM Service and Network Interworking

Frame Relay/ATM Service/Network Interworking features are accessed by selecting the `[Frame Relay/ATM Interworking Options...]` button on the `Add` or `Edit ATM Connections` screens. This button appears on the screens only when a Frame Relay port is specified as one side of a connection and an ATM port as the other side. The button is invisible if Frame Relay is not selected as the A-side or B-side port, or if setting up a Frame Relay-to-Frame Relay connection.

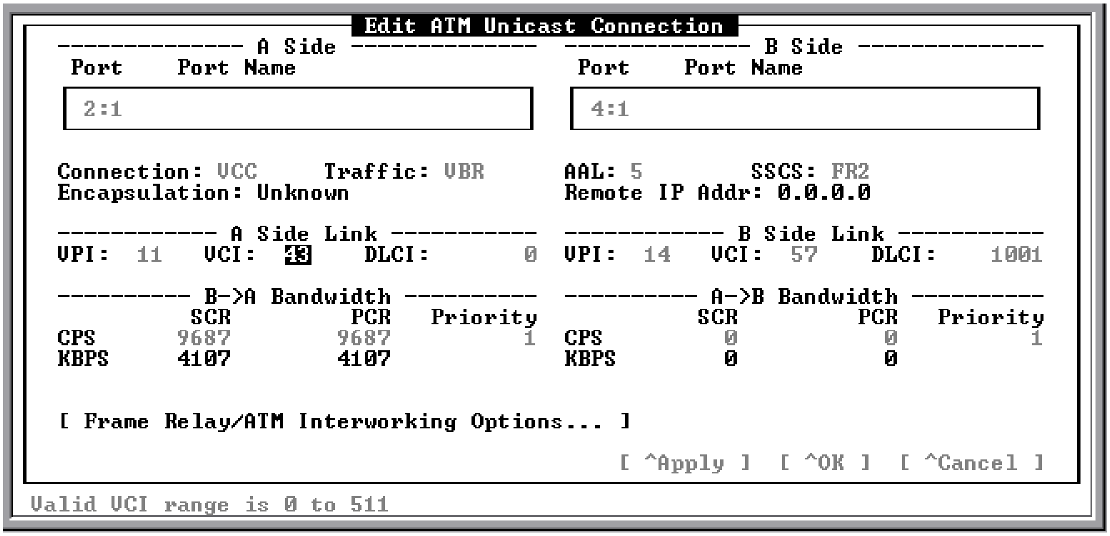


Figure 6.12 - *CellPath* 300 Edit ATM Unicast Connections Screen

Selecting the `[Frame Relay/ATM Interworking Options...]` button displays the `Frame Relay/ATM Interworking Options` screen (see Figure 6.13). The fields on this screen are used to specify the Frame Relay-to-ATM PVC options.

Use the screen to:

- Map header bits between Frame Relay frames and ATM cells
- Specify the use of Transparent or Translation Mode

Before opening the `Frame Relay/ATM Interworking Options` screen, specify whether the connection is to use Frame Relay Service Interworking or Frame Relay Network Interworking. This choice depends upon the architecture of the network and the options chosen by the carrier in other parts of the network. Choose Frame Relay Service Interworking by setting the `SSCS` field on the `Add/Edit ATM Connections` screen to `Null`.

Choose Frame Relay Network Interworking by setting the SSCS field to either FR2 or FR4. (For more information on Frame Relay Service Interworking and Frame Relay Network Interworking, refer to the *CellPath 300 ATM WAN Multiplexer User's Manual* or the appropriate Frame Relay Forum implementation agreements.)

Opening the `Frame Relay/ATM Interworking Options` screen when the SSCS field is set to Null (Frame Relay Service Interworking), all fields on the screen can be edited. Opening the screen when the SSCS field is set to FR2 or FR4 (Frame Relay Network Interworking), only the `Cell Loss Priority (CLP) mode` and `Discard Eligibility (DE) mode` fields can be edited. The other fields on the screen are not selectable in Frame Relay Network Interworking.

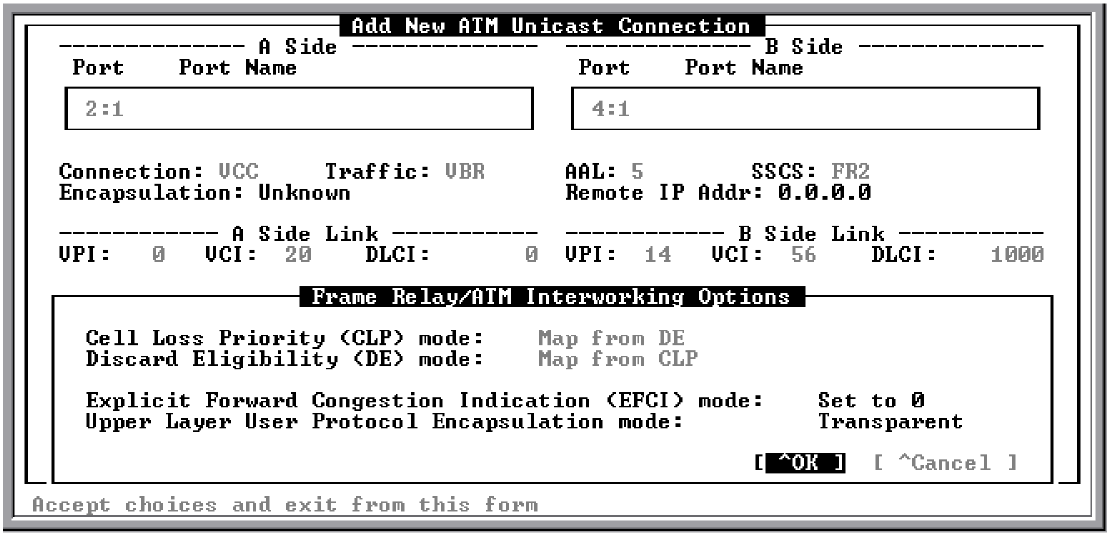


Figure 6.13 - Frame Relay Interworking Options Screen

The options available when the PVC is set to Frame Relay Service Interworking are:

Cell Loss Priority (CLP) mode

Specifies how the CLP bit is set in the cell headers of all cells segmented from the Frame Relay frames on this PVC.

Map From DE (default)—Copies the DE bit from the Frame Relay frame header directly into the ATM cell header's CLP bit.

Set to 0—Sets the ATM cell header's CLP bit to 0.

Set to 1—Sets the ATM cell header's CLP bit to 1.

Discard Eligibility (DE) mode

Specifies how the DE bit in the Frame Relay frame header is set when ATM cells are reassembled into Frame Relay frames.

Map From CLP (default)—Sets the DE bit in the Frame Relay frame header to 1 if any ATM cell in the frame is received for reassembly with its CLP bit set to 1. It sets the DE bit to 0 if all cells received for reassembly have CLP set to 0. Use this option if tagging actions in the ATM network are to affect Frame Relay congestion actions.

Set to 0—Sets the DE bit in the Frame Relay frame header to 0.

Set to 1—Sets the DE bit in the Frame Relay frame header to 1.

Explicit Forward Congestion Indication (EFCI) mode

Specifies how EFCI is set in the ATM cell headers of cells segmented from Frame Relay frames.

Set to 0 (default)—Sets EFCI in the ATM cell header to 0 to indicate “congestion not experienced” for all cells segmented from Frame Relay frames on this PVC.

Map from FECN—Sets EFCI in the ATM cell header to 1 for all cells segmented from a Frame Relay frame received with its FECN bit set to 1. It sets EFCI to 0 if FECN is received as 0.

Upper Layer User Protocol Encapsulation mode

Specifies whether the upper layer protocol encapsulation is translated from RFC 1490 to RFC 1483 in the Frame Relay-to-ATM direction, and from RFC 1483 to RFC 1490 in the ATM-to-Frame Relay direction.

Transparent (default)—Performs no translation of the upper layer protocol encapsulation. Use this option if the terminal equipment at the endpoints of the connection use the same encapsulation or if they are able to adapt to each other’s encapsulation.

Translation Mode—Translates RFC 1490-encapsulated frames to RFC 1483-encapsulated frames prior to segmenting the frames into cells. Cells received for reassembly on this PVC are expected to contain frames encapsulated with RFC

1483. This mode translates the reassembled frames to RFC 1490 encapsulation before transmitting them as Frame Relay frames. Received frames or frames reassembled from cells that contain an unrecognized encapsulation are discarded per FRF.8. Use this option when the endpoint on the Frame Relay side uses RFC 1490 encapsulation and the endpoint on the ATM side uses RFC 1483 encapsulation, and neither endpoint can be configured to adapt to the other's encapsulation.

[^OK] Select [^OK] to set the parameters and dismiss the screen. Scroll the cursor to the [^OK] button and press <ENTER> or use <Ctrl-O> to activate the [^OK] button.

NOTE The [^Apply] or [^OK] option on the Add/Edit Connections screen must be selected before the *CellPath* 300 modifies the operation of the connection.

[^Cancel] Select [^Cancel] to exit the screen without setting the parameters. Scroll the cursor to the [^Cancel] button and press <ENTER> or use <Ctrl-C> to cancel the screen.

The options available when the PVC is set to Frame Relay Network Interworking are:

Cell Loss Priority (CLP) mode: Specifies how the CLP bit is set in the cell headers of all cells segmented from the Frame Relay frames on this PVC.

Map From DE (default)—Copies the DE bit from the Frame Relay frame header directly into the ATM cell header's CLP bit.

Set to 0—Sets ATM cell header's CLP bit to 0.

Set to 1—Sets ATM cell header's CLP bit to 1.

Discard Eligibility (DE) mode Specifies how the DE bit in the Frame Relay frame header is set when ATM cells are reassembled into Frame Relay frames for this PVC.

Map From CLP (default)—Sets the DE bit in the Frame Relay frame header to 1 if any ATM cell in the frame is received for reassembly with its CLP bit set to 1 or if the transported Frame Relay header DE bit is set to 1. Otherwise, it sets the Frame Relay DE bit to 0. Use this option if tagging actions in the ATM network are to affect Frame Relay congestion actions.

Use FR-SSCS DE—For Frame Relay Network Interworking, the entire Frame Relay frame header is included in the payload of the first cell segmented from the frame. This option takes the value of the DE bit from the DE bit in the transported Frame Relay frame header. Use this option to insulate Frame Relay congestion actions from ATM network tagging/congestion actions.

Explicit Forward Congestion Indication (EFCI) mode Not applicable. Defaults to the only valid option for Frame Relay Network Interworking.

Upper Layer User Protocol Encapsulation mode Not applicable. Defaults to the only valid option for Frame Relay Network Interworking.

[^OK] Select `[^OK]` to set the parameters and dismiss the screen. Scroll the cursor to the `[^OK]` button and press `<ENTER>` or use `<Ctrl-O>` to activate the `[^OK]` button.

NOTE The `[^Apply]` or `[^OK]` option on the `Add/Edit Connections` screen must be selected before the *CellPath* 300 modifies the operation of the connection.

[^Cancel] Select `[^Cancel]` to exit without setting the parameters. Scroll the cursor to the `[^Cancel]` button and press `<ENTER>` or use `<Ctrl-C>` to cancel the screen.

6.9.1 Using Frame Relay Network Interworking connections

To set up a Frame Relay Network Interworking connection, set the `SSCS` field in the `Add/Edit Connection` screen to either FR2 for 2-byte headers or FR4 for 4-byte headers.

Be aware that when using Frame Relay Network Interworking, both ends of the Frame Relay connection must use the same DLCI. With Frame Relay Network Interworking, the DLCI from the originating Frame Relay frame is copied into the transported AAL5 PDU and is then copied into the header of the destination frame at reassembly. If different DLCIs are specified at each end, the terminal equipment cannot receive the traffic transmitted by the other end's terminal equipment because the traffic appears on the wrong DLCI.

6.9.2 Changing a PVC Between Service and Network Interworking

When editing the SSCS value of a PVC from "Null" (Frame Relay Service Interworking) to "FR2" or "FR4" (Frame Relay Network Interworking), or vice versa, some of the PVC settings may be illegal for the new setting. If this occurs, a warning box is received that indicates the nature of the problem. If the `[^OK]` button in the warning box is selected, the original connection is restored and the `Edit Connection` screen disappears. It is necessary to open the `Frame Relay/ATM Interworking Options` screen and set the options to a valid combination for the new type of connection being established, then select `[^OK]` and apply the connection again.

6.10 Configuring a Packet Port for Frame Relay Link Management

Configuring FRLM consists of setting the operational modes for each packet port, setting the state of OAM cell generation, and setting the timers and counters for tracking events and errors.

6.10.1 Accessing the Screen

Select the `[Link Mgmt...]` button on a packet port selection screen. Figure 6.14 is displayed.

NOTE

This screen appears only if the port has been configured to use Frame Relay UNI packet protocol. Otherwise, a message appears stating that this port is not configured for Frame Relay.

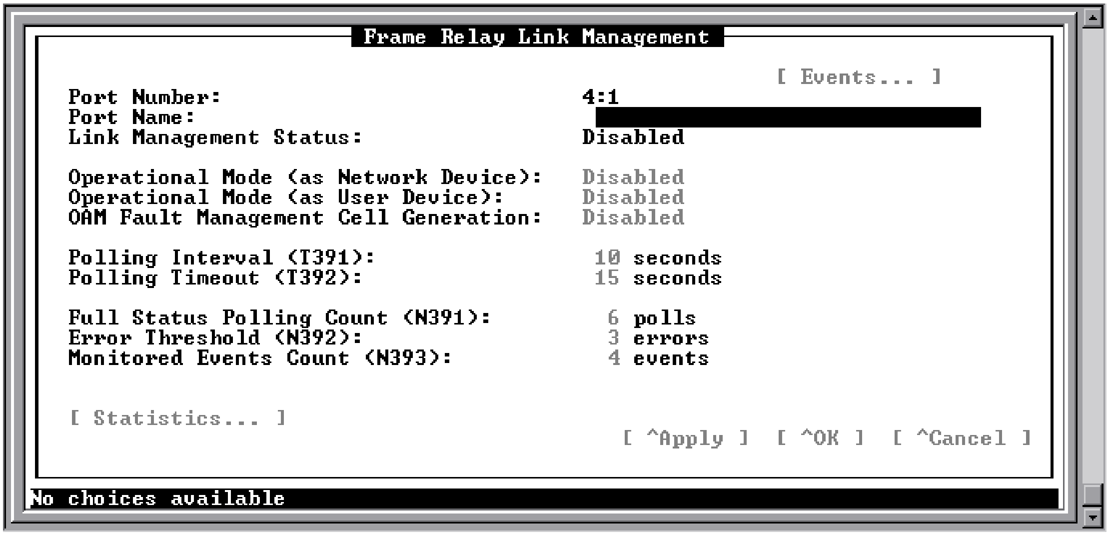


Figure 6.14 - Frame Relay Link Management Screen

6.10.2 Operational Modes

Depending on whether the port is configured as a network device or a user device, it can be set to either send or receive requests. If the port is configured as a network device it responds to requests. If the port is configured as a user device, it generates requests. If both operational modes are enabled, the port is set to operate bidirectionally.

Enabling the operational mode for either field adds a FRLM cross-connection to the System Controller, using the DLCI value of 0 (zero) on the Frame Relay UNI port side.

NOTE If DLCI 0 has already been used for another cross-connection, or if too many connections already exist on this port, the *CellPath* 300 does not add this FRLM connection automatically and leaves the Operational Modes disabled.

If the FRLM cross-connect is manually deleted it sets both `Operational Mode` fields to `Disabled`.

6.10.3 Operational Mode as a Network Device

When configuring the port as a network device, the Operational Mode options are:

Disabled Does not receive requests or generate responses (default).

Auto-Detect Enables the port to receive FRLM requests and automatically generate a response using the same format as the request. The supported formats are ITU-T Q.933 Annex A or ANSI T1.617a-1994 Annex D.

6.10.4 Operational Mode as a User Device

When configuring the port as a user device, the Operational Mode options are:

Disabled Disables the generation of STATUS ENQUIRY messages on the link (default).

This operational mode can be enabled with one of two formats:

ITU-T Q.933, Annex A Enables the port to generate STATUS ENQUIRY requests using the ITU-T Q.933 Annex A format.

ANSI T1.617a-1994, Annex D Enables the port to generate STATUS ENQUIRY requests using the ANSI T1.617a-1994 Annex D format.

6.10.5 OAM Fault Management Cell Generation

OAM fault management cells allow end-to-end PVC status indication to flow between two Frame Relay DTEs across a mix of ATM and Frame Relay networks. This field is used to allow or prevent the generation of OAM fault management cells at a Frame Relay UNI port, and the subsequent passage of these OAM cells out cell ports. The settings for each cell port determine whether internally-generated OAM cells are allowed to pass through. Some ATM equipment cannot properly process the received OAM cells. Enable this option only if the endpoint devices have this capability.

The OAM Fault Management Cell Generation options are:

Enabled Allows OAM fault management cells to be generated at this port.

Disabled Prevents OAM fault management cells from being generated at this port (default).

6.10.5.1 Generating OAM Cells with FRLM

The following rules apply for the generation of OAM cells in the A-side to B-side only. Equivalent rules apply for the other direction (B-side to A-side).

6.10.5.1.1 Pre-conditions for Generating OAM FRLM Cells

The following conditions must be met to generate OAM cells.

- The A-side port must be capable of generating OAM FRLM cells. Currently, only VBR / Packet ports that are configured for Frame Relay UNI are allowed to do this.
- The B-side port must be capable of passing internally-generated OAM cells. Currently, only Cell ports configured for ATM / HEC or ATM / PLCP are allowed to do this.
- The A-side port must be ENABLED to generate OAM cells.
- The B-side port must be ENABLED to pass internally-generated OAM cells.
- The connection between the A-side port and B-side port must be unicast (as opposed to multicast), VCC (as opposed to VPC), with bidirectional bandwidth configured (unless it is a “looped” connection with the same slot, port, VPI, and VCI on both sides, in which case it has bandwidth only in the A-side to B-side direction).

6.10.5.1.2 Reasons for Generating OAM Cells

OAM cells are generated for the following reasons:

- AIS F5 cells should be generated if the A-side port is operationally down at the PM or PLM level or has a FRLM service-affecting condition. The following describes when a port is considered to be operationally down at the PM level:

  A Cell port is operationally down if it has HEC CDC, PLCP LOF, or PLCP YEL alarms.

  A VBR / Packet port is never operationally down.

  The SC (port 1:1) is never operationally down.
- The following describes when a port is considered to be operationally down at the PLM level:

  An OC-3 port is operationally down if it has LOS, LOF, Rx-AIS, Line RDI, Path LOP, Path AIS, or Path RDI alarms, or if it has line loopback set.

  A DS3 port is operationally down if it has LOS, LOF, Rx-AIS, Rx-RAI, or Far End LOS or LOF alarms, or if it has line loopback set.

  An E3 port is operationally down if it has LOS, LOF, Rx-AIS, or Rx-RAI alarms, or if it has line loopback set.

  A J2 port is operationally down if it has LOS, LOF, Rx-AIS, Rx-RAI, Rx-PAIS, or LOQ alarms, or if it has line loopback set.

  An E1 port is operationally down if it has LOS, LOF, Rx-AIS, or Rx-RAI alarms, or if it has line loopback set.

  A DSX-1 port is operationally down if it has LOS, LOF, Rx-AIS, or Rx-RAI alarms, or if it has line loopback set.

  A V.35 / EIA-530 port is operationally down if it has LOS or LOC alarms, or if it has line loopback set.

  Otherwise, RDI F5 cells should be generated if the A-side port is receiving AIS F5 cells in the B-side to A-side direction.

  Otherwise, no OAM F5 cells should be generated.

OAM FM cells should be generated once per second per applicable PVC while the reason for generating them applies.

6.10.6 Polling Interval (T391)

Assigns the number of seconds the Frame Relay port, acting as a ***user device***, waits between generating STATUS ENQUIRY messages.

Set an integer between 5 and 255 seconds, inclusive, to be the polling interval. This interval value must be less than the value used for the polling timeout. The default value is 10 seconds.

6.10.7 Polling Timeout (T392)

Assigns the number of seconds the Frame Relay port, acting as a ***network device***, waits before declaring that an expected STATUS ENQUIRY was not received.

Set an integer between 5 and 255 seconds, inclusive, to be the timeout value. The timeout value must be greater than the value used for the polling interval. The default value is 15 seconds.

6.10.8 Full Status Polling Count (N391)

Sets the counter value for how often the Frame Relay port, when acting as a ***user device***, sends STATUS ENQUIRY messages as Full Status requests rather than Link Integrity Verification requests.

Set an integer between 1 and 255 polling cycles, inclusive.

The default value is 6 polls. If the default count is not used, the Full Status Polling Count setting should be greater than the Monitored Event Count setting.

6.10.9 Error Threshold (N392)

Sets the counter value for the number of errors that occur within a defined period of monitored events (see below). The threshold set determines how many errors to allow before the system considers the link to be down due to a service-affecting condition.

Set an integer between 1 and 10, inclusive, to be the error threshold.

The default value is 3 errors. If the default count is not used, ensure that the Error Threshold setting is less than the Monitored Event Count setting.

Errors are counted:

- when an expected request or response is not received within the configured number of seconds.
- when a request or a response with an invalid sequence number is received.
- when an unsolicited response is received.

6.10.10 Monitored Events Count (N393)

Sets the number of events to examine for errors. For instance, if the count is set to 10, the system examines the last ten events looking for errors. If the number of errors exceeds the threshold (see above), the system considers the link to be down due to a service effecting condition.

Set an integer between 1 and 10, inclusive, to be the monitored events count. The monitored events count must be greater than or equal to the error threshold.

The default value is 4 events. If the default count is not used, ensure that the Monitored Events Count setting is less than the Full Status Polling Count and greater than the Error Threshold setting.

- Events are counted:
- when a valid request or response is received.
- when any one of the errors (defined above) is counted.

6.10.11 Exiting the Screen

The [^Apply] button applies any changes made in the screen, without exiting the screen. The keyboard equivalent is <Ctrl-A>.

The [^OK] button applies any changes made in the screen, then exits the screen. The keyboard equivalent is <Ctrl-O>.

The [^Cancel] button exits the screen without applying any changes made in the screen. The keyboard equivalent is <Ctrl-C>.

APPENDIX A Converting DFAs or DLCIs and VPI/VCIs

Because of the similarities between ATM DXI, Frame Relay, and ATM UNI interfaces, there is a direct correlation between the connection identifiers used in each. ATM DXI uses a connection identifier called a DXI Frame Address (DFA). Frame Relay uses a connection identifier called a Data Link Connection Identifier (DLCI). ATM UNI uses a connection identifier called a VPI/VCI.

On the *CellPath* 300, all connection identifiers must be expressed as VPI/VCIs. This appendix provides the information required to convert between VPI/VCIs and DFAs or DLCIs.

The topics discussed in the chapter are as follows:

- The different kinds of Frame Relay and ATM DXI headers and how they affect the conversion process
- Conversion procedures and formulas
- Reserved values
- Examples
- Sample C code for a conversion program

A scientific calculator is recommended when performing Frame Relay or ATM DXI conversions involving 4-byte headers.

A.1 Frame Relay and ATM DXI Header Types

There are four different types of headers: 2-byte Frame Relay, 2-byte ATM DXI, 4-byte Frame Relay, and 4-byte ATM DXI. The header format in use must be known in order to select the correct formula for determining the VPI / VCI. Table A.1 summarizes the four different types of headers.

Table A.1 - Frame Relay / ATM DXI Header Types

Header type	Description
Frame Relay or ATM DXI 2-byte header	The 2-byte header is essentially the same for ATM DXI and Frame Relay. A 2-byte header has 10 bits reserved for the connection identifier. This allows for 2^{10} (1024) possible connections. This type of header has a fixed mapping into ATM VPI / VCIs (see Table A.6).
ATM DXI 4-byte header	A 4-byte header originating from an ATM DXI service has 24 bits reserved for the connection identifier. This type of header has a fixed mapping into ATM VPI / VCIs. There are 8 bits reserved for the VPI and 9 bits reserved for the VCI. This means there are 2^8 possible VPIs and 2^9 possible VCIs for 2^8 x 2^9 (131072) total possible connections.
Frame Relay 4-byte header	A 4-byte header originating from a Frame Relay UNI service has 23 bits reserved for the connection identifier. This type of header uses the same mappings as required by the 4-byte header that originated from ATM DXI. There are 8 bits reserved for the VPI and 8 bits reserved for the VCI. There are 2^8 (256) possible VPI s and 2^8 possible VCIs for a total of 2^8 x 2^8 (65536) possible connections. Due to the way this header type is mapped to VPI / VCIs, only even-numbered VCIs are allowed.

A.1.1 4-Byte Header Diagrams

Table A.2 and Table A.3 are included for the advanced ATM user. They explain how the VPI / VCI values are encoded in the 4-byte headers for Frame Relay and ATM DXI. The `VPI` and `VCI` fields are not contiguous, and so the conversion formulas are not straightforward.

A.1.1.1 ATM DXI Header

Table A.2 - ATM DXI 4-Byte Headers

Byte	Bit							
	7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
0	VPI 7 DFA 23	VPI 6 DFA 22	VPI 5 DFA 21	VPI 4 DFA 20	VPI 3 DFA 19	VPI 2 DFA 18	RSVD: 0	EA: 0
1	VCI 15 DFA 17	VCI 14 DFA 16	VPI 1 DFA 15	VPI 0 DFA 14	CH: X	RSVD: 0	CLP: X	EA: 0
2	VCI 13 DFA 13	VCI 12 DFA 12	VCI 11 DFA 11	VCI 10 DFA 10	VCI 9 DFA 9	VCI 8 DFA 8	VCI 7 DFA 7	EA: 0
3	VCI 6 DFA 6	VCI 5 DFA 5	VCI 4 DFA 4	VCI 3 DFA 3	VCI 2 DFA 2	VCI 1 DFA 1	VCI 0 DFA 0	EA: 1

A.1.1.2 Frame Relay Header

Table A.3 - Frame Relay 4-Byte Headers

Byte	Bit							
	7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
0	VPI 7 DLCI 22	VPI 6 DLCI 21	VPI 5 DLCI 20	VPI 4 DLCI 19	VPI 3 DLCI 18	VPI 2 DLCI 17	C/R: X	EA: 0
1	VCI 15 DLCI 16	VCI 14 DLCI 15	VPI 1 DLCI 14	VPI 0 DLCI 13	FECN: X	BECN: 0	DE: X	EA: 0
2	VCI 13 DLCI 12	VCI 12 DLCI 11	VCI 11 DLCI 10	VCI 10 DLCI 9	VCI 9 DLCI 8	VCI 8 DLCI 7	VCI 7 DLCI 6	EA: 0
3	VCI 6 DLCI 5	VCI 5 DLCI 4	VCI 4 DLCI 3	VCI 3 DLCI 2	VCI 2 DLCI 1	VCI 1 DLCI 0	VCI 0 D/C: 0	EA: 1

A.2 Conversion Procedures

These procedures explain how to convert between VPI/VCIs and DFAs or DLCIs.

A.2.1 Scientific Calculator Recommended

If attempting these calculations by hand, a scientific calculator capable of doing remainder (sometimes called modulus) operations is very helpful. If the calculator cannot do these calculations, it is necessary to calculate remainders using long division. Here is an example:

The expression: $\mathrm{REM}\left(\frac{\mathrm{VPI}}{4}\right)$ means divide the VPI value by 4 and take the remainder.

$\mathrm{REM}\left(\frac{\mathrm{VPI}}{4}\right)$ where the VPI = 173

$$\begin{array}{r|l} & \;\;4\,3 \\ \cline{2-2} 4 & 1\,7\,3 \\ & 1\,6 \\ \cline{2-2} & \;\;1\,3 \\ & \;\;1\,2 \\ \cline{2-2} & \;\;\;\;1 \end{array}$$

$\leftarrow$ Remainder

$$\mathrm{REM}\left(\frac{173}{4}\right) = 1$$

A.2.2 VPI/VCI to DFA or DLCI

Table A.4 shows the procedures used to convert from VPI/VCIs to DFAs or DLCIs.

NOTE

All division operations shown in Table A.4 are integer division. This means the division must be performed first and then truncate the remainder. Do not round the number, simply truncate it.

(e.g., $\frac{14}{4} = 3.5$ becomes 3)

Table A.4 - VPI / VCI to DFA or DLCI

Header	Procedure Description
ATM DXI or Frame Relay 2-byte header	Look up the VPI / VCI values in Table A.6 to see what the corresponding DFA or DLCI value is.
ATM DXI 4-byte header	Use this formula: $DFA = \left(\frac{VPI}{4} \times 262144\right) + \left(REM\left(\frac{VPI}{4}\right) \times 16384\right) + VCI$ The VPI must be in the range: 0...255. The VCI must be in the range: 0...511.
Frame Relay 4-byte header	Use this formula: $DLCI = \left(\frac{VPI}{4} \times 131072\right) + \left(REM\left(\frac{VPI}{4}\right) \times 8192\right) + \frac{VCI}{2}$ The VPI must be in the range: 0...255. The VCI must be even and in the range: 0...510.

A.2.3 DFA or DLCI to VPI/VCI

Table A.4 shows the procedures used to convert from DFAs or DLCIs to VPI / VCIs.

NOTE

All division operations shown in Table A.4 are integer division. This means the division must be performed first and then truncate the remainder. Do not round the number, simply truncate it.

(e.g., $\frac{14}{4} = 3.5$ becomes 3)

Converting DFAs or DLCIs and VPI/VCIs

Table A.5 - DFA or DLCI to VPI/VCI

Header	**Procedure Description**
ATM DXI or Frame Relay 2-byte header	Look up the DFA or DLCI value in Table A.6 and see what the corresponding VPI/VCI values are.
ATM DXI 4-byte header	Follow these steps: To calculate the VPI value from the DFA, use the formula below: $VPI = \left(\frac{\mathrm{DFA}}{262144} \times 4\right) + \mathrm{REM}\left(\frac{\left(\frac{\mathrm{DFA}}{16384}\right)}{4}\right)$ To calculate the VCI value from the DFA, use the formula below: $VCI = \left(\mathrm{REM}\left(\frac{\left(\frac{\mathrm{DFA}}{65536}\right)}{4}\right) \times 16384\right) + \mathrm{REM}\left(\frac{\mathrm{DFA}}{16834}\right)$
Frame Relay 4-byte header	Follow these steps: To calculate the VPI value from the DLCI, use the formula below: $VPI = \left(\frac{\mathrm{DLCI}}{131072} \times 4\right) + \mathrm{REM}\left(\frac{\left(\frac{\mathrm{DLCI}}{8192}\right)}{4}\right)$ To calculate the VCI value from the DLCI, use the formula below: $VCI = \left(\mathrm{REM}\left(\frac{\left(\frac{\mathrm{DLCI}}{32768}\right)}{4}\right) \times 16384\right) + \mathrm{REM}\left(\frac{\mathrm{DLCI}}{8192} \times 2\right)$

NOTE

Some VPI/VCIs are reserved channels for communications between devices on the network (see Chapter 6). If the conversion process yields one of these VPI/VCIs, reconfigure the device to use a DLCI or DFA that does not translate into a restricted VPI/VCI.

A.3 Conversion Table

A.3.1 Frame Relay and ATM DXI 2-Byte Header to VPI/VCI

The italicized entries in Table A.6 are reserved values and should not be used for user data when connecting into a public network. See Chapter 6 for more information.

Table A.6 - Frame Relay and ATM DXI 2-Byte Header to VPI / VCI Conversion Table

DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI
0	0	0	27	1	11	54	3	6	81	5	1
1	0	1	28	1	12	55	3	7	82	5	2
2	0	2	29	1	13	56	3	8	83	5	3
3	0	3	30	1	14	57	3	9	84	5	4
4	0	4	31	1	15	58	3	10	85	5	5
5	0	5	32	2	0	59	3	11	86	5	6
6	0	6	33	2	1	60	3	12	87	5	7
7	0	7	34	2	2	61	3	13	88	5	8
8	0	8	35	2	3	62	3	14	89	5	9
9	0	9	36	2	4	63	3	15	90	5	10
10	0	10	37	2	5	64	4	0	91	5	11
11	0	11	38	2	6	65	4	1	92	5	12
12	0	12	39	2	7	66	4	2	93	5	13
13	0	13	40	2	8	67	4	3	94	5	14
14	0	14	41	2	9	68	4	4	95	5	15
15	0	15	42	2	10	69	4	5	96	6	0
16	1	0	43	2	11	70	4	6	97	6	1
17	1	1	44	2	12	71	4	7	98	6	2
18	1	2	45	2	13	72	4	8	99	6	3
19	1	3	46	2	14	73	4	9	100	6	4
20	1	4	47	2	15	74	4	10	101	6	5
21	1	5	48	3	0	75	4	11	102	6	6
22	1	6	49	3	1	76	4	12	103	6	7
23	1	7	50	3	2	77	4	13	104	6	8
24	1	8	51	3	3	78	4	14	105	6	9
25	1	9	52	3	4	79	4	15	106	6	10
26	1	10	53	3	5	80	5	0	107	6	11

Table A.6 - Frame Relay and ATM DXI 2-Byte Header to VPI / VCI Conversion Table

DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI
108	6	12	137	8	9	166	10	6	195	12	3
109	6	13	138	8	10	167	10	7	196	12	4
110	6	14	139	8	11	168	10	8	197	12	5
111	6	15	140	8	12	169	10	9	198	12	6
112	7	0	141	8	13	170	10	10	199	12	7
113	7	1	142	8	14	171	10	11	200	12	8
114	7	2	143	8	15	172	10	12	201	12	9
115	7	3	144	9	0	173	10	13	202	12	10
116	7	4	145	9	1	174	10	14	203	12	11
117	7	5	146	9	2	175	10	15	204	12	12
118	7	6	147	9	3	176	11	0	205	12	13
119	7	7	148	9	4	177	11	1	206	12	14
120	7	8	149	9	5	178	11	2	207	12	15
121	7	9	150	9	6	179	11	3	208	13	0
122	7	10	151	9	7	180	11	4	209	13	1
123	7	11	152	9	8	181	11	5	210	13	2
124	7	12	153	9	9	182	11	6	211	13	3
125	7	13	154	9	10	183	11	7	212	13	4
126	7	14	155	9	11	184	11	8	213	13	5
127	7	15	156	9	12	185	11	9	214	13	6
128	8	0	157	9	13	186	11	10	215	13	7
129	8	1	158	9	14	187	11	11	216	13	8
130	8	2	159	9	15	188	11	12	217	13	9
131	8	3	160	10	0	189	11	13	218	13	10
132	8	4	161	10	1	190	11	14	219	13	11
133	8	5	162	10	2	191	11	15	220	13	12
134	8	6	163	10	3	192	12	0	221	13	13
135	8	7	164	10	4	193	12	1	222	13	14
136	8	8	165	10	5	194	12	2	223	13	15

Table A.6 - Frame Relay and ATM DXI 2-Byte Header to VPI / VCI Conversion Table

DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI
224	14	0	253	15	13	282	1	26	311	3	23
225	14	1	254	15	14	283	1	27	312	3	24
226	14	2	255	15	15	284	1	28	313	3	25
227	14	3	256	0	16	285	1	29	314	3	26
228	14	4	257	0	17	286	1	30	315	3	27
229	14	5	258	0	18	287	1	31	316	3	28
230	14	6	259	0	19	288	2	16	317	3	29
231	14	7	260	0	20	289	2	17	318	3	30
232	14	8	261	0	21	290	2	18	319	3	31
233	14	9	262	0	22	291	2	19	320	4	16
234	14	10	263	0	23	292	2	20	321	4	17
235	14	11	264	0	24	293	2	21	322	4	18
236	14	12	265	0	25	294	2	22	323	4	19
237	14	13	266	0	26	295	2	23	324	4	20
238	14	14	267	0	27	296	2	24	325	4	21
239	14	15	268	0	28	297	2	25	326	4	22
240	15	0	269	0	29	298	2	26	327	4	23
241	15	1	270	0	30	299	2	27	328	4	24
242	15	2	271	0	31	300	2	28	329	4	25
243	15	3	272	1	16	301	2	29	330	4	26
244	15	4	273	1	17	302	2	30	331	4	27
245	15	5	274	1	18	303	2	31	332	4	28
246	15	6	275	1	19	304	3	16	333	4	29
247	15	7	276	1	20	305	3	17	334	4	30
248	15	8	277	1	21	306	3	18	335	4	31
249	15	9	278	1	22	307	3	19	336	5	16
250	15	10	279	1	23	308	3	20	337	5	17
251	15	11	280	1	24	309	3	21	338	5	18
252	15	12	281	1	25	310	3	22	339	5	19

Table A.6 - Frame Relay and ATM DXI 2-Byte Header to VPI / VCI Conversion Table

DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI
340	5	20	369	7	17	398	8	30	427	10	27
341	5	21	370	7	18	399	8	31	428	10	28
342	5	22	371	7	19	400	9	16	429	10	29
343	5	23	372	7	20	401	9	17	430	10	30
344	5	24	373	7	21	402	9	18	431	10	31
345	5	25	374	7	22	403	9	19	432	11	16
346	5	26	375	7	23	404	9	20	433	11	17
347	5	27	376	7	24	405	9	21	434	11	18
348	5	28	377	7	25	406	9	22	435	11	19
349	5	29	378	7	26	407	9	23	436	11	20
350	5	30	379	7	27	408	9	24	437	11	21
351	5	31	380	7	28	409	9	25	438	11	22
352	6	16	381	7	29	410	9	26	439	11	23
353	6	17	382	7	30	411	9	27	440	11	24
354	6	18	383	7	31	412	9	28	441	11	25
355	6	19	384	8	16	413	9	29	442	11	26
356	6	20	385	8	17	414	9	30	443	11	27
357	6	21	386	8	18	415	9	31	444	11	28
358	6	22	387	8	19	416	10	16	445	11	29
359	6	23	388	8	20	417	10	17	446	11	30
360	6	24	389	8	21	418	10	18	447	11	31
361	6	25	390	8	22	419	10	19	448	12	16
362	6	26	391	8	23	420	10	20	449	12	17
363	6	27	392	8	24	421	10	21	450	12	18
364	6	28	393	8	25	422	10	22	451	12	19
365	6	29	394	8	26	423	10	23	452	12	20
366	6	30	395	8	27	424	10	24	453	12	21
367	6	31	396	8	28	425	10	25	454	12	22
368	7	16	397	8	29	426	10	26	455	12	23

Table A.6 - Frame Relay and ATM DXI 2-Byte Header to VPI / VCI Conversion Table

DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI
456	12	24	485	14	21	514	0	34	543	1	47
457	12	25	486	14	22	515	0	35	544	2	32
458	12	26	487	14	23	516	0	36	545	2	33
459	12	27	488	14	24	517	0	37	546	2	34
460	12	28	489	14	25	518	0	38	547	2	35
461	12	29	490	14	26	519	0	39	548	2	36
462	12	30	491	14	27	520	0	40	549	2	37
463	12	31	492	14	28	521	0	41	550	2	38
464	13	16	493	14	29	522	0	42	551	2	39
465	13	17	494	14	30	523	0	43	552	2	40
466	13	18	495	14	31	524	0	44	553	2	41
467	13	19	496	15	16	525	0	45	554	2	42
468	13	20	497	15	17	526	0	46	555	2	43
469	13	21	498	15	18	527	0	47	556	2	44
470	13	22	499	15	19	528	1	32	557	2	45
471	13	23	500	15	20	529	1	33	558	2	46
472	13	24	501	15	21	530	1	34	559	2	47
473	13	25	502	15	22	531	1	35	560	3	32
474	13	26	503	15	23	532	1	36	561	3	33
475	13	27	504	15	24	533	1	37	562	3	34
476	13	28	505	15	25	534	1	38	563	3	35
477	13	29	506	15	26	535	1	39	564	3	36
478	13	30	507	15	27	536	1	40	565	3	37
479	13	31	508	15	28	537	1	41	566	3	38
480	14	16	509	15	29	538	1	42	567	3	39
481	14	17	510	15	30	539	1	43	568	3	40
482	14	18	511	15	31	540	1	44	569	3	41
483	14	19	512	0	32	541	1	45	570	3	42
484	14	20	513	0	33	542	1	46	571	3	43

Table A.6 - Frame Relay and ATM DXI 2-Byte Header to VPI / VCI Conversion Table

DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI
572	3	44	601	5	41	630	7	38	659	9	35
573	3	45	602	5	42	631	7	39	660	9	36
574	3	46	603	5	43	632	7	40	661	9	37
575	3	47	604	5	44	633	7	41	662	9	38
576	4	32	605	5	45	634	7	42	663	9	39
577	4	33	606	5	46	635	7	43	664	9	40
578	4	34	607	5	47	636	7	44	665	9	41
579	4	35	608	6	32	637	7	45	666	9	42
580	4	36	609	6	33	638	7	46	667	9	43
581	4	37	610	6	34	639	7	47	668	9	44
582	4	38	611	6	35	640	8	32	669	9	45
583	4	39	612	6	36	641	8	33	670	9	46
584	4	40	613	6	37	642	8	34	671	9	47
585	4	41	614	6	38	643	8	35	672	10	32
586	4	42	615	6	39	644	8	36	673	10	33
587	4	43	616	6	40	645	8	37	674	10	34
588	4	44	617	6	41	646	8	38	675	10	35
589	4	45	618	6	42	647	8	39	676	10	36
590	4	46	619	6	43	648	8	40	677	10	37
591	4	47	620	6	44	649	8	41	678	10	38
592	5	32	621	6	45	650	8	42	679	10	39
593	5	33	622	6	46	651	8	43	680	10	40
594	5	34	623	6	47	652	8	44	681	10	41
595	5	35	624	7	32	653	8	45	682	10	42
596	5	36	625	7	33	654	8	46	683	10	43
597	5	37	626	7	34	655	8	47	684	10	44
598	5	38	627	7	35	656	9	32	685	10	45
599	5	39	628	7	36	657	9	33	686	10	46
600	5	40	629	7	37	658	9	34	687	10	47

Table A.6 - Frame Relay and ATM DXI 2-Byte Header to VPI / VCI Conversion Table

DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI
688	11	32	717	12	45	746	14	42	775	0	55
689	11	33	718	12	46	747	14	43	776	0	56
690	11	34	719	12	47	748	14	44	777	0	57
691	11	35	720	13	32	749	14	45	778	0	58
692	11	36	721	13	33	750	14	46	779	0	59
693	11	37	722	13	34	751	14	47	780	0	60
694	11	38	723	13	35	752	15	32	781	0	61
695	11	39	724	13	36	753	15	33	782	0	62
696	11	40	725	13	37	754	15	34	783	0	63
697	11	41	726	13	38	755	15	35	784	1	48
698	11	42	727	13	39	756	15	36	785	1	49
699	11	43	728	13	40	757	15	37	786	1	50
700	11	44	729	13	41	758	15	38	787	1	51
701	11	45	730	13	42	759	15	39	788	1	52
702	11	46	731	13	43	760	15	40	789	1	53
703	11	47	732	13	44	761	15	41	790	1	54
704	12	32	733	13	45	762	15	42	791	1	55
705	12	33	734	13	46	763	15	43	792	1	56
706	12	34	735	13	47	764	15	44	793	1	57
707	12	35	736	14	32	765	15	45	794	1	58
708	12	36	737	14	33	766	15	46	795	1	59
709	12	37	738	14	34	767	15	47	796	1	60
710	12	38	739	14	35	768	0	48	797	1	61
711	12	39	740	14	36	769	0	49	798	1	62
712	12	40	741	14	37	770	0	50	799	1	63
713	12	41	742	14	38	771	0	51	800	2	48
714	12	42	743	14	39	772	0	52	801	2	49
715	12	43	744	14	40	773	0	53	802	2	50
716	12	44	745	14	41	774	0	54	803	2	51

Table A.6 - Frame Relay and ATM DXI 2-Byte Header to VPI / VCI Conversion Table

DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI
804	2	52	833	4	49	862	5	62	891	7	59
805	2	53	834	4	50	863	5	63	892	7	60
806	2	54	835	4	51	864	6	48	893	7	61
807	2	55	836	4	52	865	6	49	894	7	62
808	2	56	837	4	53	866	6	50	895	7	63
809	2	57	838	4	54	867	6	51	896	8	48
810	2	58	839	4	55	868	6	52	897	8	49
811	2	59	840	4	56	869	6	53	898	8	50
812	2	60	841	4	57	870	6	54	899	8	51
813	2	61	842	4	58	871	6	55	900	8	52
814	2	62	843	4	59	872	6	56	901	8	53
815	2	63	844	4	60	873	6	57	902	8	54
816	3	48	845	4	61	874	6	58	903	8	55
817	3	49	846	4	62	875	6	59	904	8	56
818	3	50	847	4	63	876	6	60	905	8	57
819	3	51	848	5	48	877	6	61	906	8	58
820	3	52	849	5	49	878	6	62	907	8	59
821	3	53	850	5	50	879	6	63	908	8	60
822	3	54	851	5	51	880	7	48	909	8	61
823	3	55	852	5	52	881	7	49	910	8	62
824	3	56	853	5	53	882	7	50	911	8	63
825	3	57	854	5	54	883	7	51	912	9	48
826	3	58	855	5	55	884	7	52	913	9	49
827	3	59	856	5	56	885	7	53	914	9	50
828	3	60	857	5	57	886	7	54	915	9	51
829	3	61	858	5	58	887	7	55	916	9	52
830	3	62	859	5	59	888	7	56	917	9	53
831	3	63	860	5	60	889	7	57	918	9	54
832	4	48	861	5	61	890	7	58	919	9	55

Table A.6 - Frame Relay and ATM DXI 2-Byte Header to VPI / VCI Conversion Table

DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI	DFA/ DLCI	VPI	VCI
920	9	56	949	11	53	978	13	50	1007	14	63
921	9	57	950	11	54	979	13	51	1008	15	48
922	9	58	951	11	55	980	13	52	1009	15	49
923	9	59	952	11	56	981	13	53	1010	15	50
924	9	60	953	11	57	982	13	54	1011	15	51
925	9	61	954	11	58	983	13	55	1012	15	52
926	9	62	955	11	59	984	13	56	1013	15	53
927	9	63	956	11	60	985	13	57	1014	15	54
928	10	48	957	11	61	986	13	58	1015	15	55
929	10	49	958	11	62	987	13	59	1016	15	56
930	10	50	959	11	63	988	13	60	1017	15	57
931	10	51	960	12	48	989	13	61	1018	15	58
932	10	52	961	12	49	990	13	62	1019	15	59
933	10	53	962	12	50	991	13	63	1020	15	60
934	10	54	963	12	51	992	14	48	1021	15	61
935	10	55	964	12	52	993	14	49	1022	15	62
936	10	56	965	12	53	994	14	50	1023	15	63
937	10	57	966	12	54	995	14	51			
938	10	58	967	12	55	996	14	52			
939	10	59	968	12	56	997	14	53			
940	10	60	969	12	57	998	14	54			
941	10	61	970	12	58	999	14	55			
942	10	62	971	12	59	1000	14	56			
943	10	63	972	12	60	1001	14	57			
944	11	48	973	12	61	1002	14	58			
945	11	49	974	12	62	1003	14	59			
946	11	50	975	12	63	1004	14	60			
947	11	51	976	13	48	1005	14	61			
948	11	52	977	13	49	1006	14	62			

A.4 Examples

The conversion process for ATM and Frame Relay connection identifiers is not difficult, but it can be confusing. Here are some connection identifier example conversions.

A.4.1 VPI/VCI to Frame Relay or ATM DXI 2-Byte Header

A.4.1.1 Problem

Convert VPI / VCI 4,51 to its corresponding DFA / DLCI value.

A.4.1.2 Solution

Consult Table A.6. The entry for VPI / VCI 4,51 shows that the DFA / DLCI value is 835.

A.4.1.3 VPI/VCI to ATM DXI 4-Byte Header

A.4.1.4 Problem

Convert VPI / VCI value 4,50 to its corresponding DFA value (24-bit header).

A.4.1.5 Solution

Consult Table A.4. The formula is as follows:

$$DFA = \left(\frac{\mathrm{VPI}}{4} \times 262144\right) + \left(\mathrm{REM}\left(\frac{\mathrm{VPI}}{4}\right) \times 16384\right) + \mathrm{VCI}$$

$$DFA = \left(\frac{4}{4} \times 262144\right) + \left(\mathrm{REM}\left(\frac{4}{4}\right) \times 16384\right) + 50$$

$$DFA = 262144 + 0 + 50$$

$$DFA = 262194$$

The VPI / VCI value 4,50 corresponds to DFA value 262194.

A.4.2 VPI/VCI to Frame Relay 4-Byte Header

A.4.2.1 Problem

Convert VPI / VCI 4,50 to its corresponding DLCI value (23-bit header).

Converting DFAs or DLCIs and VPI/VCIs

A.4.2.2 Solution

Consult Table A.4. The formula is as follows:

$$DLCI = \left(\frac{\text{VPI}}{4} \times 131072\right) + \left(\text{REM}\left(\frac{\text{VPI}}{4}\right) \times 8192\right) + \frac{\text{VCI}}{2}$$

$$DLCI = \left(\frac{4}{4} \times 131072\right) + \left(\text{REM}\left(\frac{4}{4}\right) \times 8192\right) + \frac{50}{2}$$

$$DLCI = 131072 + 0 + 25$$

$$DLCI = 131097$$

The VPI / VCI value 4,50 corresponds to DLCI value 131097.

A.4.3 Frame Relay or ATM DXI 2-Byte Header to VPI/VCI

A.4.3.1 Problem

Convert DFA / DLCI value 1002 to its corresponding ATM VPI / VCI values.

A.4.3.2 Solution

Consult Table A.6. The entry for DFA / DLCI value 1002 has a corresponding VPI / VCI value of 14,58.

A.4.4 Frame Relay 4-Byte Header to VPI/VCI

A.4.4.1 Problem

Convert DLCI value 802971 to its corresponding VPI / VCI value.

A.4.4.2 Solution

Consult Table A.4. The formulas are as follows:

$$VPI = \left(\frac{\text{DLCI}}{131072} \times 4\right) + \text{REM}\left(\frac{\left(\frac{\text{DLCI}}{8192}\right)}{4}\right)$$

$$VPI = \left(\frac{802971}{131072} \times 4\right) + \text{REM}\left(\frac{\left(\frac{802971}{8192}\right)}{4}\right)$$

$$VPI = 24 + 2$$

$$VPI = 26$$

$$VCI = \left(\text{REM}\left(\frac{\frac{\text{DLCI}}{32768}}{4}\right) \times 16384\right) + \left(\text{REM}\left(\frac{\text{DLCI}}{8192}\right) \times 2\right)$$

$$VCI = \left(\text{REM}\left(\frac{\frac{802971}{32768}}{4}\right) \times 16384\right) + \left(\text{REM}\left(\frac{802971}{8192}\right) \times 2\right)$$

$$VCI = (0 \times 16384) + (155 \times 2)$$

$$VCI = 310$$

The DLCI value 802971 corresponds to VPI / VCI value 26310.

A.4.5 ATM DXI 4-Byte Header to VPI/VCI

A.4.5.1 Problem

Convert DFA value 1065120 its corresponding VPI / VCI value.

A.4.5.2 Solution

Consult Table A.4. The formulas are as follows:

The DFA value 1065120 corresponds to VPI / VCI value 17160.

$$VPI = \left(\frac{\text{DFA}}{262144} \times 4\right) + \text{REM}\left(\frac{\left(\frac{\text{DFA}}{16384}\right)}{4}\right)$$

$$VPI = \left(\frac{1065120}{262144} \times 4\right) + \text{REM}\left(\frac{\left(\frac{1065120}{16384}\right)}{4}\right)$$

$$VPI = (4 \times 4) + \text{REM}\left(\frac{65}{1}\right)$$

$$VPI = (4 \times 4) + 1$$

$$VPI = 16 + 1$$

$$VPI = 17$$

$$VCI = \left(\text{REM}\left(\frac{\frac{\text{DFA}}{65536}}{4}\right) \times 16384\right) + \text{REM}\left(\frac{\text{DFA}}{16384}\right)$$

$$VCI = \left(\text{REM}\left(\frac{\frac{1065120}{65536}}{4}\right) \times 16384\right) + \text{REM}\left(\frac{1065120}{16384}\right)$$

$$VCI = \text{REM}\left(\frac{16}{4}\right) \times 16384 + 160$$

$$VCI = (0 \times 16384) + 160$$

$$VCI = 160$$

A.5 C code Conversion Program

Access to a computer with a C compiler is a great asset if a lot of Frame Relay DLCI or ATM DXI DFA to VPI/VCI (or vice versa) conversions are to be done. If this is the case, the use of this program may help. It is assumed that the user knows how to enter, compile, and run C programs. If not, see the system administrator.

A.5.1 C Source Code

```
#include <stdio.h>

#define TRUE             1
#define FALSE            0

int main()
{
   int choice,
       done,
       vpi,
       vci;
   long int dfa;
   long int dlci;

   done = FALSE;

   while( done == FALSE )
   {
      printf(“\n\n\n\nDFA Conversion Utility” );
      printf(“\n” );
      printf(“\n  1. DFA to VPI/VCI” );
      printf(“\n  2. DLCI to VPI/VCI” );
      printf(“\n  3. VPI/VCI to Frame Relay DLCI” );
      printf(“\n  4. VPI/VCI to ATM DXI DFA”);
      printf(“\n  5. quit” );
      printf(“\n\nChoice: “ );

      scanf( “%d”,&choice );

      switch( choice )
      {
         case 1 : printf(“\nEnter DFA: “ );
                  scanf( “%ld”, &dfa );
                  printf(“\nVPI/VCI = %ld,%ld”,
```

Converting DFAs or DLCIs and VPI/VCIs

```
                      ((dfa / 262144) * 4 ) + ((dfa / 16384) % 4 ),
                      (((dfa / 65536) % 4 ) * 16384) + (dfa % 16384 ));
                 break;

          case 2 : printf("\nEnter DLCI: " );
                 scanf( "%ld", &dlci );
                 printf("\nVPI/VCI = %ld,%ld",
                      ((dlci / 131072) * 4 ) + ((dlci / 8192) % 4 ),
                      (((dlci / 32768) % 4) *16384)+((dlci % 8192) * 2));
                 break;

          case 3 : printf( "\nEnter VPI,VCI: " );
                 scanf( "%d,%d",&vpi,&vci );
                 if( vci % 2 != 0 )
                 {
                     printf("\nERROR: odd VCIs are not possible when convert-
ing" );
                     printf("\n       to 23 bit headers." );
                 }
                 else
                 {
                     printf("\nDLCI: %ld",
                       ((vpi/4) * 131072)+((vpi % 4)*8192)+(vci/2));
                 }
                 break;

          case 4 : printf( "\nEnter VPI,VCI: " );
                 scanf( "%d,%d",&vpi,&vci );
                 printf("\nDFA: %ld",
                      ((vpi / 4) * 262144)+((vpi % 4) * 16384) + vci);
                 break;

          case 5 : done = TRUE;
                 break;

          default: printf( "\nInvalid selection.\n" );
      }
   }
}
```

APPENDIX B Configuration Worksheets

This appendix provides “blank” configuration worksheets that can be filled out prior to configuring, or during configuration of, the *CellPath* 300 ATM WAN Multiplexer. These worksheets can make the configuration task easier since all the information needed for the task is gathered before starting to program the unit. Refer to Chapter 5 for detailed descriptions of the options presented on each worksheet.

For each unit, fill out:

- One “System Configuration Worksheet”
- One “Port Worksheet” for each interface (it may be necessary to make duplicate copies of some worksheets if several of the same port types are installed)
- One “Remote Access Worksheet”

CellPath 300 System Configuration Worksheet

If using Telnet, give the CellPath 300 the same Telnet system name assigned it in the host file.

System name (255 characters):

____

____

System location (255 characters):

____

____

System contact (255 characters):

____

____

System reference clock, primary:

- ○ Internal (default)
- ○ Rx clock from slot ____ port ____

System reference clock, secondary:

- ○ Internal (default)
- ○ Rx clock from slot ____ port ____

Use the recovered receive (Rx) clock from any port as the CellPath 300 system reference clock. Select "Rx Clock" if connecting to a public or private network that supplies a timing source. Select "Internal" if the CellPath 300 internal oscillator provides the timing for the network circuit. The CellPath 300 defaults to its internal clock if both the primary and secondary clock sources are lost.

Cell / OC-3c/STM1 SM or MM Port Worksheet (Sheet 1 of 2)

Port:

Slot #: _____ Port #: _____

Port name (31 characters):

____

A 31-character name can be assigned to each port. Select a name reflective of the port function or of the terminal equipment attached to the port. This name appears in port forms and reports.

Circuit Identifier (255 characters):

____

____

If the circuit vendor assigned the circuit a name or number, enter that number could as the circuit identifier. The identifier is viewable from the user interface and is returned as a MIB object.

Port Alarm Mode:

- ○ Standby (default)
- ○ Active

Medium Type:

- ○ SONET OC-3c (default)
- ○ SDH STM1

Port Laser Mode:

- ○ On
- ○ Off (default)

Port Tx clock:

- ○ System Clk (default)
- ○ Loop Rx (receive clock)

Select “System Clk” to use the CellPath 300 reference clock to time the transmit data from the port. Select “Loop Rx” to time the transmit data from a clock signal recovered from the incoming bit stream. If this port is being used as the source of the system reference clock, set the port transmit clock to “Loop Rx”.

Medium type:

- ○ SONET/OC-3c (default)
- ○ SDH/STM1

Scrambling:

ATM Payload:

- ○ On (default)
- ○ Off

SONET:

- ○ On (default)
- ○ Off

Set framing type and payload scrambling to match the service or equipment connected to the port. Set SONET to “on” for normal operations; set it to “off” only for testing purposes.

Configuration Worksheets

Cell / OC-3c/STM1 SM or MM Port Worksheet (Sheet 2)

OAM Cell Generation:

- ○ Disabled (default)
- ○ Enabled

Error Insertion:

	On	Off
Sect BIP-8	○	○
Line BIP-24	○	○
Path BIP-8	○	○
Line AIS	○	○
Path AIS	○	○

Cell / DS3 Port Worksheet

Port:

Slot #: _____ Port #: _____

Port name (31 characters):

____

A 31-character name can be assigned to each port. Select a name reflective of the port function or of the terminal equipment attached to the port. This name appears in port forms and reports.

Circuit Identifier (255 characters):

____

____

If the circuit vendor assigned the circuit a name or number, enter that number could as the circuit identifier. The identifier is viewable from the user interface and is returned as a MIB object.

Port Alarm Mode:

- ○ Standby (default)
- ○ Active

Port Protocol:

- ○ ATM/PLCP (default)
- ○ ATM/HEC

Cell payload scrambling:

- ○ Enabled (default)
- ○ Disabled

OAM Cell Generation:

- ○ Disabled (default)
- ○ Enabled

Framing format:

- ○ C-bit (default)
- ○ M23

Line build out:

- ○ Disabled (default)
- ○ Enabled < 200 ft

Set these parameters to match the service or equipment connected to the port. Disable line build out if you are using a short cable and are experiencing high bit error rates.

Port Tx clock:

- ○ System Clk (default)
- ○ Rx loop (receive clock)

Select "System Clk" to use the CellPath 300 reference clock to time the transmit data from the port. Select "Loop Rx" to time the transmit data from a clock signal recovered from the incoming bit stream. If this port is being used as the source of the system reference clock, set the port transmit clock to "Loop Rx".

Cell / E3 Port Worksheet

Port:

Slot #: _____ Port #: _____

Port name (31 characters):

____

A 31-character name can be assigned to each port. Select a name reflective of the port function or of the terminal equipment attached to the port. This name appears in port forms and reports.

Circuit Identifier (255 characters):

____

____

If the circuit vendor assigned the circuit a name or number, enter that number could as the circuit identifier. The identifier is viewable from the user interface and is returned as a MIB object.

Port Protocol:

○ ATM/HEC (default)

Cell payload scrambling:

○ Enabled

○ Disabled (default)

OAM Cell Generation:

○ Disabled (default)

○ Enabled

Port Tx clock:

○ System Clk (default) ○ Rx loop (receive clock)

Select “System Clk” to use the CellPath 300 reference clock to time the transmit data from the port. Select “Loop Rx” to time the transmit data from a clock signal recovered from the incoming bit stream. If this port is being used as the source of the system reference clock, set the port transmit clock to “Loop Rx”.

Framing format:

○ G.832 (default)

Line build out:

○ Disabled (default)

○ Enabled < 200 ft

Set these parameters to match the service or equipment connected to the port. Enable line build out if a short cable is being used and are high bit error rates are being experienced.

Cell / J2 Port Worksheet

Port:

Slot #:________ Port #:___1___

Port Name (31 characters):

____

A 31-character name can be assigned to each port. Select a name reflective of the port function or of the terminal equipment attached to the port. This name appears in port forms and reports.

Circuit Identifier (255 characters):

____

____

If the circuit vendor assigned the circuit a name or number, enter that number could as the circuit identifier. The identifier is viewable from the user interface and is returned as a MIB object.

Port Protocol:

- ○ ATM/HEC (default)

Cell Payload Scrambling:

- ○ Disabled (default)
- ○ Enabled

OAM Cell Generation:

- ○ Disabled (default)
- ○ Enabled

Port Tx clock:

○ System Clk (default) ○ Rx loop (receive clock)

Set framing type and payload scrambling to match the service or equipment connected to the port. Set frame scrambling to "on" for normal operations; set it to "off" only for testing purposes (see the User's Guide).

Rx Equalization:

- ○ Short (default) (< 120 m / 400 ft)
- ○ Long (> 120 m / 400 ft)

Select the Rx Equalization according to the length of cable connected to the J2 port.

Cell / DSX-1 Port Worksheet

Port:

Slot #: _____ Port #: _____

Port name (31 characters):

____

A 31-character name can be assigned to each port. Select a name reflective of the port function or of the terminal equipment attached to the port. This name appears in port forms and reports.

Circuit Identifier (255 characters):

____

____

If the circuit vendor assigned the circuit a name or number, enter that number could as the circuit identifier. The identifier is viewable from the user interface and is returned as a MIB object.

Port Protocol:

- O ATM/PLCP (default)
- O ATM/HEC

Cell payload scrambling:

- O Disabled (default)
- O Enabled

OAM Cell Generation:

- O Disabled (default)
- O Enabled

Port Tx clock:

- O System Clk (default)
- O Rx loop from attached terminal device

Select "System Clk" to use the CellPath 300 reference clock to time the transmit data from the port. Select "Loop Rx" to time the transmit data from a clock signal recovered from the incoming bit stream. If this port is being used as the source of the system reference clock, set the port transmit clock to "Loop Rx".

Framing Format:

- O ESF (default)
- O SF (D4)

Line code:

- O B8ZS (default)
- O AMI

Set these parameters to match the service or equipment connected to the port.

Cell / E1 Port Worksheet

Port:

Slot #: _____ Port #: _____

Port name (31 characters):

____

A 31-character name can be assigned to each port. Select a name reflective of the port function or of the terminal equipment attached to the port. This name appears in port forms and reports.

Circuit Identifier (255 characters):

____

____

If the circuit vendor assigned the circuit a name or number, enter that number could as the circuit identifier. The identifier is viewable from the user interface and is returned as a MIB object.

Port Protocol:

- ○ ATM/HEC (default)

Cell Payload Scrambling:

- ○ Enabled
- ○ Disabled (default)

OAM Cell Generation:

- ○ Enabled
- ○ Disabled (default)

Set these parameters to match the service or equipment connected to the port.

Port Tx clock:

- ○ System *Clk* (default)
- ○ Rx loop from attached terminal device

Select "System Clk" to use the CellPath 300 reference clock to time the transmit data from the port. Select "Loop Rx" to time the transmit data from a clock signal recovered from the incoming bit stream. If this port is being used as the source of the system reference clock, set the port transmit clock to "Loop Rx".

Framing format:

- ○ CRC4 Disabled, TS16 Multiframe Disabled
- ○ CRC4 Enabled, TS16 Multiframe Disabled
- ○ CRC4 Disabled, TS16 Multiframe Enabled
- ○ CRC4 Enabled, TS16 Multiframe Enabled
- ○ Unframed

Cell / IMA DSX-1 Group Worksheet (Sheet 1 of 2)

Circuit Identifier (255 characters):

____

____

If the circuit vendor assigned the circuit a name or number, enter that number as the circuit identifier. The identifier is viewable from the user interface and is returned as a MIB object.

Number of redundant links:

○ 0 ○ 1 ○ 2 ○ 3 ○ 4 (default)

This option specifies the number of links the system can lose from this group without bringing it down.
For example, if the group has four links, but the application requires at least three links, specify one redundant link. Then, if one link goes down, IMA can still transmit traffic. If two links go down, IMA stops the traffic and issues an alarm. Traffic resumes when the link comes back up.

Cell Payload Scrambling:

○ Enabled

○ Disabled (default)

Framing Format:

○ ESF (default)

○ SF (D4)

Line code:

○ B8ZS

Set these parameters to match the service or equipment connected to the port.

Maximum burst size:

○ 32 cells

○ 105 cells

○ 210 cells

○ Maximum cells (default

Setting the maximum burst size to any option other than Maximum disables packet-level discard.

Line build out:

○ 0.0 dB (default)

○ 7.5 dB

○ 15 dB

○ 22.5 dB

Line build out may need to be adjusted if there is attenuation on one of the links.

Links to use with group command:

1	**2**	**3**	**4**

Specify the links to be included in this group.

Cell / IMA DSX-1 Group Worksheet (Sheet 2)

Group Transmit clock:

○ System Clk (default)   ○ Rx loop from attached terminal device

Select “System Clk” to use the CellPath 300 reference clock to time the transmit data from the port. Select “Rx loop” to time the transmit data from a clock signal recovered from the incoming bit stream. If this port is being used as the source of the system reference clock, set the port transmit clock to “Loop Rx”.

Note: *Duplicate this worksheet for each link to be configured.*

Link:

Slot #: ______ Link #: ______

Enter the slot and link numbers.

Link name (31 characters):

____

Specify a link name.

Link Use Mode:

○ Enable (default)
○ Disable

Set this field to Disable if is not to be included in the group. Alarms may be generated when an enabled link is not included in the group.

Cell / IMA E1 Group Worksheet (Sheet 1 of 2)

Circuit Identifier (255 characters):

____

____

If the circuit vendor assigned the circuit a name or number, enter that number as the circuit identifier. The identifier is viewable from the user interface and is returned as a MIB object.

Number of redundant links:

O 0 O 1 O 2 O 3 O 4 (default)

This option specifies the number of links the system can lose from this group without bringing it down.
For example, if the group has four links, but the application requires at least three links, specify one redundant link. Then, if one link goes down, IMA can still transmit traffic. If two links go down, IMA stops the traffic and issues an alarm. Traffic resumes when the link comes back up.

Cell Payload Scrambling:

O On

O Off (default)

Framing Format:

O CRC4 Disabled (default)

O CRC4 Enabled

Set these parameters to match the service or equipment connected to the port.

Maximum burst size:

O 32 cells

O 105 cells

O 210 cells

O Maximum cells (default

Setting the maximim burst size to any option other than Maximum disables packet-level discard.

Links to use with group command:

1	2	3	4

Specify the links to be included in this group.

Configuration Worksheets

Cell / IMA E1 Group Worksheet (Sheet 2)

Group Transmit clock:

○ System Clk (default)   ○ Rx loop from attached terminal device

Select “System Clk” to use the CellPath 300 reference clock to time the transmit data from the port. Select “Rx loop” to time the transmit data from a clock signal recovered from the incoming bit stream. If this port is being used as the source of the system reference clock, set the port transmit clock to “Loop Rx”.

Note: *Duplicate this worksheet for each link to be configured.*

Link:

Slot #: ______ Link #: ______

Enter the slot and link numbers.

Link name (31 characters):

____

Specify a link name.

Link Use Mode:

○ Enable (default)

○ Disable

Set this field to Disable if is not to be included in the group. Alarms may be generated when an enabled link is not included in the group.

Packet / DS3 Port Worksheet (Sheet 1 of 2)

Port:

Slot #: _____ Port #: 1

Port name (31 characters):

____

A 31-character name can be assigned to each port. Select a name reflective of the port function or of the terminal equipment attached to the port. This name appears in port forms and reports.

Circuit Identifier (255 characters):

____

____

If the circuit vendor assigned the circuit a name or number, enter that number could as the circuit identifier. The identifier is viewable from the user interface and is returned as a MIB object.

Packet Protocol:

- ○ HDLC
- ○ ATM DXI / 2-byte header length (default)
- ○ ATM DXI / 4-byte header length
- ○ Frame Relay UNI / 2-byte header length
- ○ Frame Relay UNI /4-byte header length

CRC length for packet checking:

- ○ 16 bits (default)
- ○ 32 bits

Set these parameters to match the service or equipment connected to the port.

Framing Format:

- ○ C-bit (default)
- ○ M23

Line build out:

- ○ Enabled ≤ 225 ft.
- ○ Disabled > 225 ft. (default)

Set these parameters to match the service or equipment connected to the port. Disable line build out if using a long cable and experiencing high bit error rates.

Packet / DS3 Port Worksheet (Sheet 2)

Reassembly Time-out:

- ○ 100 ms
- ○ 200 ms (default)
- ○ 500 ms
- ○ 1000 ms

Maximum Packet Length (in bytes):

- ○ 1154
- ○ 1538
- ○ 2308
- ○ 4616
- ○ 9232

A reassembly time-out of 200 is sufficient for most applications. Increase the value only if the data is expected to experience significant delay variations, or if most of the packets are of the larger (>4500 octet size).

Closed loop flow control:

- ○ Enable (default)
- ○ Disable

Enable closed loop flow control to slow the rate of data placed on the output line when the output line becomes congested.

Port Tx Clock:

- ○ System Clk (default)
- ○ Loop Rx (receive clock)

Select "System Clk" to use the CellPath 300 reference clock to time the transmit data from the port. Select "Loop Rx" to time the transmit data from a clock signal received from the terminal device. If this port is being used as the source of the system reference clock, set the port transmit clock to "Loop Rx."

Packet / E3 Port Worksheet (Sheet 1 of 2)

Port:

Slot #: _____ Port #: 1

Port name (31 characters):

____

A 31-character name can be assigned to each port. Select a name reflective of the port function or of the terminal equipment attached to the port. This name appears in port forms and reports.

Circuit Identifier (255 characters):

____

____

If the circuit vendor assigned the circuit a name or number, enter that number could as the circuit identifier. The identifier is viewable from the user interface and is returned as a MIB object.

Packet Protocol:

- ○ HDLC
- ○ ATM DXI / 2-byte header length (default)
- ○ ATM DXI / 4-byte header length
- ○ Frame Relay UNI / 2-byte header length
- ○ Frame Relay UNI /4-byte header length

CRC length for packet checking:

- ○ 16 bits (default)
- ○ 32 bits

Line build out:

- ○ Enabled ≤ 225 ft.
- ○ Disabled > 225 ft. (default)

Set these parameters to match the service or equipment connected to the port. Disable line build out if using a short cable and experiencing high bit error rates.

Packet / E3 Port Worksheet (Sheet 2)

Reassembly Time-out:

- ○ 100 ms
- ○ 200 ms (default)
- ○ 500 ms
- ○ 1000 ms

Maximum Packet Length (in bytes):

- ○ 1154
- ○ 1538
- ○ 2308
- ○ 4616
- ○ 9232

A reassembly time-out of 200 is sufficient for most applications. Increase the value only if the data is expected to experience significant delay variations, or if most of the packets are of the larger (>4500 octet size).

Closed loop flow control:

- ○ Enable (default)
- ○ Disable

Enable closed loop flow control to slow the rate of data placed on the output line when the output line becomes congested.

Port Tx Clock:

- ○ System Clk (default)
- ○ Loop Rx (receive clock)

Select "System Clk" to use the CellPath 300 reference clock to time the transmit data from the port. Select "Loop Rx" to time the transmit data from a clock signal received from the terminal device. If this port is being used as the source of the system reference clock, set the port transmit clock to "Loop Rx."

Packet / J2 Port Worksheet (Sheet 1 of 2)

Port:

Slot #: ______ Port #: __1__

Port name (31 characters):

____

A 31-character name can be assigned to each port. Select a name reflective of the port function or of the terminal equipment attached to the port. This name appears in port forms and reports.

Circuit Identifier (255 characters):

____

____

If the circuit vendor assigned the circuit a name or number, enter that number could as the circuit identifier. The identifier is viewable from the user interface and is returned as a MIB object.

Packet Protocol:

- ○ HDLC
- ○ ATM DXI / 2-byte header length (default)
- ○ ATM DXI / 4-byte header length
- ○ Frame Relay UNI / 2-byte header length
- ○ Frame Relay UNI /4-byte header length

CRC length for packet checking:

- ○ 16 bits (default)
- ○ 32 bits

Rx equalization:

- ○ <120 meters (default)
- ○ >120 meters

Set these parameters to match the service or equipment connected to the port. Select the Rx Equalization according to the length of cable connected to the J2 port.

Packet / J2 Port Worksheet (Sheet 2)

Reassembly Time-out:

- ○ 100 ms
- ○ 200 ms (default)
- ○ 500 ms
- ○ 1000 ms

Maximum Packet Length (in bytes):

- ○ 1154
- ○ 1538
- ○ 2308
- ○ 4616
- ○ 9232

A reassembly time-out of 200 is sufficient for most applications. Increase the value only if the data is expected to experience significant delay variations, or if most of the packets are of the larger (>4500 octet size).

Closed loop flow control:

- ○ Enable (default)
- ○ Disable

Enable closed loop flow control to slow the rate of data placed on the output line when the output line becomes congested.

Port Tx Clock:

- ○ System Clk (default)
- ○ Loop Rx (receive clock)

Select "System Clk" to use the CellPath 300 reference clock to time the transmit data from the port. Select "Loop Rx" to time the transmit data from a clock signal received from the terminal device. If this port is being used as the source of the system reference clock, set the port transmit clock to "Loop Rx."

Packet (10201)/ V.35/EIA-530 Port Worksheet (Sheet 1 of 2)

Port:

Slot #: _____ Port #: _____

Port name (31 characters):

____

A 31-character name can be assigned to each port. Select a name reflective of the port function or of the terminal equipment attached to the port. This name appears in port forms and reports.

Port Mode:

- ○ V.35 (default)
- ○ EIA-530

Enter the slot and port numbers as designated on the chassis rear panel. Specify the port operating mode as V.35 or EIA-530. The EIA-530 setting also supports the EIA-449 (RS449) and X.21.

Packet Protocol:

- ○ HDLC
- ○ ATM DXI / 2-byte header length (default)
- ○ ATM DXI / 4-byte header length
- ○ Frame Relay UNI / 2-byte header length
- ○ Frame Relay UNI / 4-byte header length

CRC Length for packet checking:

- ○ 16 bits (default)
- ○ 32 bits

Port Clock Rate:

__________ 64 Kbps -- 2048 Kbps, inclusive, in multiples of 64 *or*

__________ 56 Kbps -- 1736 Kbps, inclusive, in multiples of 56; and 1544, 3088, 6176 (128 Kbps default).

In Clock Polarity:

- ○ Normal (default)
- ○ Inverted

Set these parameters to match the service or equipment connected to the port. If the equipment connected to the CellPath 300 is providing the clock rate, set the port clock to match. If the CellPath 300 is providing the clock rate, specify the desired rate.

Closed loop flow control:

- ○ Enable (default)
- ○ Disable

Enable closed loop flow control to slow the rate of data placed on the output line when the output line becomes congested.

Packet (10201)/ V.35/EIA-530 Port Worksheet (Sheet 2)

Maximum Packet Length (in bytes):

- ○ 1154
- ○ 1538
- ○ 2308
- ○ 4616
- ○ 9232

Reassembly Time-out:

- ○ 100 ms
- ○ 200 ms (default)
- ○ 500 ms
- ○ 1000 ms

A reassembly time-out of 200 is sufficient for most applications. Increase the value only if the data is expected to experience significant delay variations, or if most of the packets are of the larger (>4500 octet size). A smaller packet size allows for an increased number of concurrent reassemblies.

Clock Source:

○ System, XClk required ○ System, No XClk required ○ Loop XCLK

Use "System, XClk required" if the CellPath 300 is to provide the timing reference for the terminal equipment. Use "System, No XClk required" if the CellPath 300 is to provide the timing reference for terminal equipment that does not supply a synchronized external clock. Use "Loop XClk" when the CellPath 300 timing source is not synchronized with the terminal equipment.

In Flow Control:

- ○ None (default)
- ○ Gapped clock
- ○ DCD
- ○ CTS
- ○ DCD and CTS

Out Flow Control:

- ○ None (default)
- ○ DTR
- ○ RTS
- ○ DTR and RTS

LOS Detect:

- ○ None (default)
- ○ DTR
- ○ RTS
- ○ DTR or RTS
- ○ DTR and CTS

Specify the signalling used by the CellPath 300 for flow control. Assertion of the "out" flow control signal causes the CellPath 300 to pause transmission of data. "In" flow signals are asserted to tell the connected service or equipment to pass transmission of data. Use care when setting "out" flow control and LOS detection on the same signals; assertion on the "out" flow control signal may generate an alarm.

Packet (10203/10205)/ V.35/EIA-530 Port Worksheet (Sheet 1 of 2)

Port:

Slot #: _____ Port #: _____

Port name (31 characters):

____

A 31-character name can be assigned to each port. Select a name reflective of the port function or of the terminal equipment attached to the port. This name appears in port forms and reports.

Port Mode:

○ V.35 (default) ○ EIA-530

Enter the slot and port numbers as designated on the chassis rear panel. Specify the port operating mode as V.35 or EIA-530. The EIA-530 setting also supports the EIA-449 (RS449) and X.21.

Packet Protocol:

○ HDLC

○ ATM DXI / 2-byte header length (default)

○ ATM DXI / 4-byte header length

○ Frame Relay UNI / 2-byte header length

○ Frame Relay UNI / 4-byte header length

Port Clock Rate:

__________ 64 Kbps -- 2048 Kbps, inclusive, in multiples of 64 *or*

__________ 56 Kbps -- 1736 Kbps, inclusive, in multiples of 56; 1544, 2048 (128 Kbps default).

CRC Length for packet checking:

○ 16 bits (default)

○ 32 bits

In Clock Polarity:

○ Normal (default)

○ Inverted

Set these parameters to match the service or equipment connected to the port. If the equipment connected to the CellPath 300 is providing the clock rate, set the port clock to match. If the CellPath 300 is providing the clock rate, specify the desired rate.

Frame Relay Link Management:

○ Network device

○ User device

○ OAM Cell Generation

These apply only if the packet protocol is Frame Relay. Indicate if the port should be configured as a network device, user device, or both. Specify OAM cell generation if the end-to-end connection is between two Frame Relay devices but across an ATM network.

Packet (10203/10205)/ V.35/EIA-530 Port Worksheet (Sheet 2)

Maximum Packet Length (in bytes):

- ○ 1154
- ○ 1538
- ○ 2308
- ○ 4616
- ○ 9232

Reassembly Time-out:

- ○ 100 ms
- ○ 200 ms (default)
- ○ 500 ms
- ○ 1000 ms

A reassembly time-out of 200 is sufficient for most applications. Increase the value only if the data is expected to experience significant delay variations, or if most of the packets are of the larger (>4500 octet size). A smaller packet size allows for an increased number of concurrent reassemblies.

Clock Source:

○ System, XClk required ○ System, No XClk required ○ Loop XCLK

Use "System, XClk required" if the CellPath 300 is to provide the timing reference for the terminal equipment. Use "System, No XClk required" if the CellPath 300 is to provide the timing reference for terminal equipment that does not supply a synchronized external clock. Use "Loop XClk" when the CellPath 300 timing source is not synchronized with the terminal equipment.

In Flow Control:

- ○ None (default)
- ○ Gapped clock
- ○ DCD
- ○ CTS
- ○ DCD and CTS

Out Flow Control:

- ○ None (default)
- ○ DTR
- ○ RTS
- ○ DTR and RTS

LOS Detect:

- ○ None (default)
- ○ DTR
- ○ RTS
- ○ DTR or RTS
- ○ DTR and CTS

Specify the signalling used by the CellPath 300 for flow control. Assertion of the "out" flow control signal causes the CellPath 300 to pause transmission of data. "In" flow signals are asserted to tell the connected service or equipment to pass transmission of data. Use care when setting "out" flow control and LOS detection on the same signals; assertion on the "out" flow control signal may generate an alarm.

Packet / HSSI Port Worksheet (Sheet 1 of 2)

Port:

Slot #: _____ Port #: _____

Port name (31 characters):

____

A 31-character name can be assigned to each port. Select a name reflective of the port function or of the terminal equipment attached to the port. This name appears in port forms and reports.

Packet Protocol:

- ○ HDLC
- ○ ATM DXI / 2-byte header length (default)
- ○ ATM DXI / 4-byte header length
- ○ Frame Relay UNI / 2-byte header length
- ○ Frame Relay UNI / 4-byte header length

CRC Length for packet checking:

- ○ 16 bits (default)
- ○ 32 bits

Set these parameters to match the service or equipment connected to the port. If the equipment connected to the CellPath 300 is providing the clock rate, set the port clock to match. If the CellPath 300 is providing the clock rate, specify the desired rate.

Maximum Packet Length (in bytes):

- ○ 1154
- ○ 1538
- ○ 2308
- ○ 4616
- ○ 9232

Reassembly Time-out:

- ○ 100 ms
- ○ 200 ms (default)
- ○ 500 ms
- ○ 1000 ms

A reassembly time-out of 200 is sufficient for most applications. Increase the value only if the data is expected to experience significant delay variations, or if most of the packets are of the larger (>4500 octet) size.

Packet / HSSI Port Worksheet (Sheet 2)

Closed loop flow control:

- ○ Enable (default)
- ○ Disable

Enable closed loop flow control to slow the rate of data placed on the output line when the output line becomes congested.

Clock Source: ○ System, XClk required ○ System, No XClk required ○ Loop XCLK

Use "System, XClk required" if the CellPath 300 is to provide the timing reference for the terminal equipment. Use "System, No XClk required" if the CellPath 300 is to provide the timing reference for terminal equipment that does not supply a synchronized external clock. Use "Loop XClk" when the CellPath 300 timing source is not synchronized with the terminal equipment.

Input port clock rate:________

■ 1024 - 51200 Kbps, in increments of 512 Kbps (25600 Kbps default)

Output port clock rate:________

■ 1024 - 51200 Kbps, in increments of 512 Kbps (25600 Kbps default)

Set these parameters to match the service or equipment connected to the port. If the equipment connected to the CellPath 300 is providing the clock rate, set the port clock to match. If the CellPath 300 is providing the clock rate, specify the desired rate.

In Flow Control:	**Out Flow Control**:	**LOS Detect**:
○ None (default)	○ None (default)	○ None (default)
○ Gapped clock	○ DTR	○ DTR
○ DCD	○ RTS	○ RTS
○ CTS	○ DTR and RTS	○ DTR or RTS
○ DCD and CTS		○ DTR and CTS

Specify the signalling used by the CellPath 300 for flow control. Assertion of the "out" flow control signal causes the CellPath 300 to pause transmission of data. "In" flow signals are asserted to tell the connected service or equipment to pass transmission of data. Use care when setting "out" flow control and LOS detection on the same signals; assertion on the "out" flow control signal may generate an alarm.

Packet / DXS-1 Port Worksheet (Sheet 1 of 2)

Port:

Slot #: _____ Port #: _____

Port name (31 characters):

____

A 31-character name can be assigned to each port. Select a name reflective of the port function or of the terminal equipment attached to the port. This name appears in port forms and reports.

Circuit Identifier (255 characters):

____

____

If the circuit vendor assigned the circuit a name or number, enter that number could as the circuit identifier. The identifier is viewable from the user interface and is returned as a MIB object.

Packet Protocol:

- ○ HDLC
- ○ ATM DXI / 2-byte header length (default)
- ○ ATM DXI / 4-byte header length
- ○ Frame Relay UNI / 2-byte header length
- ○ Frame Relay UNI /4-byte header length

Framing Format:

- ○ ESF (default)
- ○ SF(D4)

Line Code:

- ○ B8ZS (default)
- ○ AMI

CRC length for packet checking:

- ○ 16 bits (default)
- ○ 32 bits

Set these parameters to match the equipment connected to the port.

Frame Relay Link Management:

- ○ Network device
- ○ User device
- ○ OAM Cell Generation

These apply only if the packet protocol is Frame Relay. Indicate if the port should be configured as a network device, user device, or both. Specify OAM cell generation if the end-to-end connection is between two FR devices but across an ATM network.

Packet / DXS-1 Port Worksheet (Sheet 2)

Reassembly Time-out:

- ○ 200 ms (default)
- ○ 500 ms
- ○ 1000 ms

Maximum Packet Length (in bytes):

	allows concurrent reassembly of
○ 1154	32 packets
○ 1538	.
○ 2308	.
○ 4616	.
○ 9232	16 packets (default)

A reassembly time-out of 200 is sufficient for most applications. Increase the value only if the data is expected to experience significant delay variations, or if most of the packets are of the larger (>4500 octet size). A smaller packet size allows for an increased number of concurrent reassemblies.

Port Tx Clock:

○ System Clk (default) ○ Loop Rx (receive clock)

Select "System Clk" to use the CellPath 300 reference clock to time the transmit data from the port. Select "Loop Rx" to time the transmit data from a clock signal received from the terminal device. If this port is being used as the source of the system reference clock, set the port transmit clock to "Loop Rx."

Channelized Data:

- ○ Disabled (default)
- ○ 64 Kbps channels
- ○ 56 Kbps channels

1							8								16								24

If using fractional T1, specify the channel size, then use the bar to mark how many channels to use. Otherwise, specify "Disabled."

Packet / E1 Port Worksheet (Sheet 1 of 2)

Port:

Slot #: _____ Port #: _____

Port name (31 characters):

____

A 31-character name can be assigned to each port. Select a name reflective of the port function or of the terminal equipment attached to the port. This name appears in port forms and reports.

Circuit Identifier (255 characters):

____

____

If the circuit vendor assigned the circuit a name or number, enter that number could as the circuit identifier. The identifier is viewable from the user interface and is returned as a MIB object.

Packet Protocol:

- ○ HDLC
- ○ ATM DXI / 2-byte header length (default)
- ○ ATM DXI / 4-byte header length
- ○ Frame Relay UNI / 2-byte header length
- ○ Frame Relay UNI /4-byte header length

CRC length for packet checking:

- ○ 16 bits (default)
- ○ 32 bits

Set these parameters to match the equipment connected to the port.

Maximum Packet Length (in bytes):

		allows concurrent reassembly of
○	1154	32 packets
○	1538	.
○	2308	.
○	4616	.
○	9232	16 packets (default)

Reassembly Time-out:

- ○ 200 ms (default)
- ○ 500 ms
- ○ 1000 ms

A reassembly time-out of 200 is sufficient for most applications. Increase the value only if you expect the data to experience significant delay variations, or if most of the packets are of the larger (>4500 octet size). A smaller packet size allows for an increased number of concurrent reassemblies.

Packet / E1 Port Worksheet (Sheet 2)

Port Tx Clock:

- ○ System Clk (default)
- ○ Loop Rx (receive clock)

Select "System Clk" to use the CellPath 300 reference clock to time the transmit data from the port. Select "Loop Rx" to time the transmit data from a clock signal received from the terminal device. If this port is being used as the source of the system reference clock, set the port transmit clock to "Loop Rx."

Framing Format:

- ○ CRC4 Disabled, TS16 Multiframe Disabled
- ○ CRC4 Enabled, TS16 Multiframe Disabled
- ○ CRC4 Disabled, TS16 Multiframe Enabled
- ○ CRC4 Enabled, TS16 Multiframe Enabled
- ○ Unframed

Frame Relay Link Management:

- ○ Network device
- ○ User device
- ○ OAM Cell Generation

These apply only if the packet protocol is Frame Relay. Indicate if the port should be configured as a network device, user device, or both. Specify OAM cell generation if the end-to-end connection is between two FR devices but across an ATM network.

Channelized Data:

- ○ Disabled (default)
- ○ N x 64

0								8								16								24							31

If using fractional E1 (64 Kbps channels) use the bar to mark how many channels to use.

Packet / V.35/EIA-530 Port Worksheet (Sheet 1 of 2)

Port:

Slot #: _____ Port #: _____

Port name (31 characters):

____

A 31-character name can be assigned to each port. Select a name reflective of the port function or of the terminal equipment attached to the port. This name appears in port forms and reports.

Packet Protocol:

- ○ HDLC
- ○ ATM DXI / 2-byte header length (default)
- ○ ATM DXI / 4-byte header length
- ○ Frame Relay UNI / 2-byte header length
- ○ Frame Relay UNI / 4-byte header length

CRC Length for packet checking:

- ○ 16 bits (default)
- ○ 32 bits

Maximum Packet Length (in bytes):

allows concurrent reassembly of

○	1154	32 packets
○	1538	.
○	2308	.
○	4616	.
○	9232	16 packets (default)

Reassembly Time-out:

- ○ 200 ms (default)
- ○ 500 ms
- ○ 1000 ms

A reassembly time-out of 200 is sufficient for most applications. Increase the value only if the data is expected to experience significant delay variations, or if most of the packets are of the larger (>4500 octet size). A smaller packet size allows for an increased number of concurrent reassemblies.

Port Mode:

- ○ V.35 (default)
- ○ EIA-530

Enter the slot and port numbers as designated on the chassis rear panel. Specify the port operating mode as V.35 or EIA-530. The EIA-530 setting also supports the EIA-449 (RS449) and X.21.

Packet / V.35/EIA-530 Port Worksheet (Sheet 2)

Frame Relay Link Management:

- ○ Network device
- ○ User device
- ○ OAM Cell Generation

These apply only if the packet protocol is Frame Relay. Indicate if the port should be configured as a network device, user device, or both. Specify OAM cell generation if the end-to-end connection is between two FR devices but across an ATM network.

Clock Source:

○ System, XClk required ○ System, No XClk required ○ Loop XCLK

Use "System, XClk required" if the CellPath 300 is to provide the timing reference for the terminal equipment. Use "System, No XClk required" if the CellPath 300 is to provide the timing reference for terminal equipment that does not supply a synchronized external clock. Use "Loop XClk" when the CellPath 300 timing source is not synchronized with the terminal equipment.

In Clock Polarity:

- ○ Normal (default)
- ○ Inverted

Port Clock Rate:

______ 64 Kbps -- 2048 Kbps, inclusive, in multiples of 64 *or*

______ 56 Kbps -- 1736 Kbps, inclusive, in multiples of 56.

______ 128 Kbps (default)

In Flow Control:

- ○ None (default)
- ○ Gapped clock
- ○ DCD
- ○ CTS
- ○ DCD and CTS

Out Flow Control:

- ○ None (default)
- ○ DTR
- ○ RTS
- ○ DTR and RTS

LOS Detect:

- ○ None (default)
- ○ DTR
- ○ RTS
- ○ DTR or RTS
- ○ DTR and CTS

Specify the signalling used by the CellPath 300 for flow control. Assertion of the "out" flow control signal causes the CellPath 300 to pause transmission of data. "In" flow signals are asserted to tell the connected service or equipment to pass transmission of data. Use care when setting "out" flow control and LOS detection on the same signals; assertion on the "out" flow control signal may generate an alarm.

CBR / DSX-1 Port Worksheet (Sheet 1 of 2)

Port:

Slot #: _____ Port #: _____

Port name (31 characters):

____

A 31-character name can be assigned to each port. Select a name reflective of the port function or of the terminal equipment attached to the port. This name appears in port forms and reports.

Circuit Identifier (255 characters):

____

____

If the circuit vendor assigned the circuit a name or number, enter that number could as the circuit identifier. The identifier is viewable from the user interface and is returned as a MIB object.

Maximum CBR Buffer Depth:

- ○ 12 cells (default)
- ○ 15 cells
- ○ 18 cells
- ○ 21 cells

A buffer depth of 12 cells is suitable for most applications. However, if higher than normal cell delay variations are experienced, increasing the buffer depth improves tolerance to such cell delay variation.

Port Tx clock:

- ● System Clk (default)

Transmission of CBR data is always timed from the CellPath 300 system reference clock. (To use the signal received at the CBR port as the timing source for transmitted data, use signal from the port as source of the system clock). The equipment attached to the port must incorporate a slip buffer to handle transmission-rate mismatches.

Framing Format:

- ○ ESF (default)
- ○ SF(D4)

Line code:

- ○ B8ZS (default)
- ○ AMI

Set these parameters to match the equipment connected to the port.

CBR / DSX-1 Port Worksheet (Sheet 2)

Behavior on LOS Detect:

- ○ Gen All 1s Cells (default)
- ○ Gen No Cells

Channelized Data:

- ○ Disabled (default)
- ○ N x 64K
- ○ N x 56K

1 8 16 24

If using fractional T1, specify the channel size, then use the bar to mark how many channels to use. Otherwise, specify “Disabled.”

CBR / E1 Port Worksheet (Sheet 1 of 2)

Port:

Slot #: _____ Port #: _____

Port name (31 characters):

____

A 31-character name can be assigned to each port. Select a name reflective of the port function or of the terminal equipment attached to the port. This name appears in port forms and reports.

Circuit Identifier (255 characters):

____

____

If the circuit vendor assigned the circuit a name or number, enter that number could as the circuit identifier. The identifier is viewable from the user interface and is returned as a MIB object.

Maximum CBR Buffer Depth:

- ○ 12 cells (default)
- ○ 15 cells
- ○ 18 cells
- ○ 21 cells

A buffer depth of 12 cells is suitable for most applications. However, if higher than normal cell delay variations are experienced, increasing the buffer depth improves tolerance to such cell delay variation.

Port Tx Clock:

- ● System Clk (default)

Transmission of CBR data is always timed from the CellPath 300 system reference clock. (To use the signal received at the CBR port as the timing source for transmitted data, use signal from the port as source of the system clock). The equipment attached to the port must incorporate a slip buffer to handle transmission-rate mismatches.

CBR / E1 Port Worksheet (Sheet 2)

Framing format:

- ○ CRC4 Disabled, TS16 Multiframe Disabled
- ○ CRC4 Enabled, TS16 Multiframe Disabled
- ○ CRC4 Disabled, TS16 Multiframe Enabled
- ○ CRC4 Enabled, TS16 Multiframe Enabled
- ○ Unframed

Set these parameters to match the equipment connected to the port.

Behavior on LOS Detect:

- ○ Gen All 1s Cells (default)
- ○ Gen No Cells

Channelized Data:

- ○ Disabled (default)
- ○ N x 64

0 8 16 24 31

If using fractional E1 (64 Kbps channels), use the bar to mark how many channels to use.

CBR / V.35/EIA-530 Port Worksheet (Sheet 1 of 2)

Port:

Slot #: _____ Port #: _____

Port name (31 characters):

____

A 31-character name can be assigned to each port. Select a name reflective of the port function or of the terminal equipment attached to the port. This name appears in port forms and reports.

Maximum CBR Buffer Depth:

- ○ 12 cells (default)
- ○ 15 cells
- ○ 18 cells
- ○ 21 cells

A buffer depth of 12 cells is suitable for most applications. However, if higher than normal cell delay variations are experienced, increasing the buffer depth can help.

LOS detect:

- ○ None (default)
- ○ DTR
- ○ RTS
- ○ DTR or RTS
- ○ DTR and CTS

Set the clock rate to match the bandwidth requirements of the attached equipment. Specify the signalling used for LOS detection.

Clock source:

○ System, XClk required ○ System, No XClk required ○ Loop XCLK

Use "System, XClk required" if the CellPath 300 is to provide the timing reference for the terminal equipment. Use "System, No XClk required" if the CellPath 300 is to provide the timing reference for terminal equipment that does not supply a synchronized external clock. Use "Loop XClk" when the CellPath 300 timing source is not synchronized with the terminal equipment.

CBR / V.35/EIA-530 Port Worksheet (Sheet 2)

Port clock rate:

__________ 64 Kbps -- 2048 Kbps, inclusive, in multiples of 64 *or*

__________ 56 Kbps -- 1736 Kbps, inclusive, in multiples of 56.

__________ 128 Kbps (default)

In Clock Polarity:

- ○ Normal (default)
- ○ Inverted

Set these parameters to match the service or equipment connected to the port. If the equipment connected to the CellPath 300 is providing the clock rate, set Port clock rate to match. If the CellPath 300 is providing the clock rate, specify the desired rate.

Port mode:

- ○ V.35 (default)
- ○ EIA-530

Enter the slot and port numbers as designated on the chassis rear panel. Specify the port operating mode as V.35 or EIA-530. The EIA-530 setting also supports the EIA-449 (RS449) and X.21.

Behavior on LOS Detect:

- ○ Gen All 1s Cells
- ○ Gen No Cells

Remote Access Worksheet (Sheet 1 of 2)

Default Router:________________________

To configure the CellPath 300 as an IP host, always define a default router. The default router must be on the same subnet as one of the configured IP interfaces (AAL5 or Ethernet).

SNMP traps:

- ○ Enabled
- ○ Disabled

SNMP trap destinations:

____

____

The CellPath 300 must be on the same subnet as the SNMP manager, or the SNMP manager must be accessible from the CellPath 300 default router.

Ethernet interface: *These entries apply to the optional PCMCIA Ethernet card.*

IP Address:____________________ **IP Netmask**:____________________

In-band IP over ATM (AAL5) interface

These entries apply to a single in-band IP over ATM interface. If multiple in-band interfaces are to be configured, fill out a sheet for each one.

IP Address:____________________ **IP Netmask**:____________________

All IP addresses and IP netmasks should be entered using dotted-decimal notation (nnn.nnn.nnn.nnn).

	A Side	**B Side**
Port:	____________________	____________________
VPI / VCI:	____________________	____________________

(Note: The System Controller's VPI/VCI is used to compute the DLCI embedded in the FR-SSCS header for FR2 and FR4.)

Remote Access Worksheet (Sheet 2)

Sustained Rate cells/sec: ________________ ________________

Peak Rate cells/sec: ________________ ________________

Priority: ________________ ________________

If the bandwidth for the connection is known, use the general guideline of 173 cells-per-second for each 64 Kbits of bandwidth. If the bandwidth required for the connections is not known, simply set the bandwidth to a value of approximately 4500 cells-per-second. This low cell rate is adequate to establish remote access to the system. The bandwidth can always be increased or decreased as experience is gained regarding the amount of SNMP traffic being transmitted through the connection.

Set the priority to a value between 1 and 4, inclusive, where 1 is the highest priority and 4 is the lowest.

Encapsulation:

- ○ Null (IP over ATM - no header)
- ○ LLC/SNAP (IP over ATM)
- ○ NLPID (IP over Frame Relay)
- ○ EtherType (Earlier non-IETF Frame Relay Encapsulation)

The encapsulation at both ends of the connection must be the same. Check the router manual for information regarding encapsulation settings.

SSCS:

- ○ Null (Frame Relay Service Interworking)
- ○ FR2 (Frame Relay Network Interworking, 2-byte headers)
- ○ FR4 (Frame Relay Network Interworking, 4-byte headers)

Specify the service-specific convergence sublayer.

AAL:	**Connection**:	**Traffic**:
● AAL5	● VCC	● VBR

For in-band IP over ATM connections, always use AAL5 and VCC, and specify VBR traffic.

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